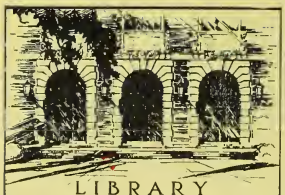


LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS
614.09
Un3m
no.18-39

Return this book on or before the
Latest Date stamped below.

University of Illinois Library

APR 13 1957
MAY 11 1957
27 1957
MAY 19 1958
FEB -3 1960
NOV 13 1960
JAN 26 1961
OCT 14 1961
AUG -6 1962
OCT -9 1963
NOV 18 1963
MAR -8 1965
JUL 23 1966
APR 14 1967
NOV 30 1970
NOV 14 1977
OCT 25 1977

L161—H41

Digitized by the Internet Archive
in 2015

https://archive.org/details/miscellaneouspub1839unit

o14.09
Un3m
no.19

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

UNIVERSITY OF ILLINOIS LIBRARY

MISCELLANEOUS PUBLICATION No. 19

UNIVERSITY OF ILLINOIS LIBRARY

INSTRUCTIONS TO MEDICAL OFFICERS IN CHARGE OF STATE CONTROL OF VENEREAL DISEASES

1918

Prepared by direction of the Surgeon General

WASHINGTON
GOVERNMENT PRINTING OFFICE
1918

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 19

INSTRUCTIONS TO MEDICAL OFFICERS IN CHARGE OF STATE CONTROL OF VENEREAL DISEASES

1918

Prepared by direction of the Surgeon General

WASHINGTON
GOVERNMENT PRINTING OFFICE
1918

614.09
Un3m
no. 19-24

INSTRUCTIONS TO MEDICAL OFFICERS IN CHARGE OF STATE CONTROL OF VENEREAL DISEASES.

ORGANIZATION.

The Division of Venereal Diseases in the Bureau of the Public Health Service is organized in two sections, as follows:

The medical section deals with the relations of the Public Health Service to State control of venereal diseases, and with Federal clinics in extra cantonment zones.

The educational section is developing educational measures against venereal diseases,—literature, lectures, moving pictures, etc., and is securing the cooperation of official agencies and the great business and social organizations of the country, for the diffusion of information on all aspects of the venereal disease problem.

The entire division is cooperating with the State boards of health and other State officials, as well as with unofficial organizations of allied purpose and good standing. It also works in close cooperation with the Surgeons General of the Army and Navy, with the Commissions on Training Camp Activities of the War and Navy Departments, and with the American Red Cross.

In each State which accepts the cooperation of this division a commissioned officer of the Public Health Service is assigned for venereal disease control under the direction of the State department of health; or a physician, selected by the State health authorities and approved and recommended for appointment by the Surgeon General of the United States Public Health Service, is appointed an acting assistant surgeon in the Public Health Service, and assigned for the general purpose of cooperating with the State health officer and supervising the work of venereal disease control in that State. He thus becomes the joint appointee and representative of both the State board of health and the Public Health Service; he shall report to both and shall carry out the wishes and policies of both. If any conflict should become apparent, he shall report the same to both offices for adjustment. He is hereinafter referred to as the medical officer.

GENERAL POLICY.

It is the aim and purpose of this division to reduce the prevalence of the venereal diseases as much and as rapidly as possible by the detection and treatment of all carriers not otherwise under treatment and

by preventing the exposure of other persons to these infectious cases. There must therefore be a thorough campaign of medical treatment, combined with the application of all measures that experience has shown to be helpful, such as education, law enforcement, follow-up work, etc. The moral problems which are involved are recognized as being very important, and all organizations, properly qualified to attack them, will be encouraged in every way possible. Because of the emergency of war every medical officer is especially called upon to exercise the greatest intelligence, energy, and thoroughness in developing this extremely important work.

STATE ORGANIZATION.

It will be the duty of the medical officer to build up a strong State-wide organization that will become more and more self-sustaining as time goes on. He will study local conditions and make such modifications of the procedure here outlined as in his judgment are necessary.

The following groups should be interested and their support enlisted:

1. Local board of health.
2. Local medical profession.
3. City officials, especially the mayor, judges, district or city attorneys, and police.
4. Local bar association.
5. Chambers of commerce, boards of trade, etc.
6. The press.
7. Religious bodies.
8. Women's clubs.
9. Educators.
10. Large employers of labor.
11. Labor organizations.
12. Hospital managements and boards.
13. Local district nursing organizations.
14. Local druggists' organizations.
15. Farmers organizations in surrounding counties.
16. All other organizations interested in public health and social hygiene.

The hearty backing of the people of the State will make it possible to pass additional laws and ordinances, if needed, and to enforce them, and to secure funds for clinics, hospitals, detention homes, and the necessary educational and law-enforcement work. To obtain this support the medical officer shall take every opportunity to inform the public on the venereal disease problem and the means necessary for its solution.

But it will not be necessary to do much of this educational work before getting clinics started. Experience has proved that it fre-

quently takes but a single meeting with the officials and leading citizens of a town to secure the funds necessary to organize a clinic and begin work. Clinics in themselves, too, have a very great educational value. Conversely, public education on the venereal diseases immediately leads many people to seek treatment, and it is of the highest importance that adequate facilities for treatment should be ready for them. The main educational campaign should therefore be postponed until most of the cities and larger towns have established venereal disease clinics. The medical officer will therefore energetically stimulate the establishment of such clinics, using, however, tact and discretion in attaining the ends sought.

CLINICS.

Venereal disease clinics will be organized under the direct supervision of the medical officer, acting as the representative of the State board of health, who will forward to the Surgeon General of the United States Public Health Service evidence in writing that each clinic has been thus organized, together with the date when its supervision was taken over by the State health department. These clinics should have a very close relation to the county health officer and the local medical profession, and to the community in general.

The standards for venereal disease clinics are to be determined jointly by the State health officer and the medical officer of the Public Health Service. It is requested, however, that these standards shall conform as closely as possible to the requirements here given.

1. *Staff.*—There shall be at least two physicians attached to each clinic. They shall be men of the highest moral character, professional training, and ability, of whom the best grade of work can be demanded, and who enjoy the confidence of their community. Where such men can not be secured, the medical officer shall not attempt to establish a clinic, for it would only discredit the whole plan of work.

One of these physicians shall be the director of the clinic and the other the assistant director. The diagnosis and treatment of all cases shall be in the hands of the director or assistant director, or under their immediate supervision. In addition, they shall arrange for the proper treatment of patients who are temporarily unable to attend. Other local physicians shall be encouraged to assist at the clinic, for their own instruction as well as for the more adequate treatment of the patients.

The director of the clinic shall be responsible to the medical officer for the conduct of the clinic, and, in general, for its results, and for the safety of its property when there is no separate fiscal agent. He shall direct the work of the other members of the staff and define their duties, subject to these regulations. The assistant director shall act for him in his absence.

There shall be at least one female nurse, who shall assist the doctors during all examinations and treatments of female patients. After being thoroughly instructed by the director she may, if he finds her qualified, give the simpler routine treatments to female patients. She shall take female case histories, if desired, and shall have charge of the medical supplies.

There shall be at least one female social worker, who shall see all patients on their first visit and investigate their social relations and home conditions. She shall endeavor to bring in for examination the members of the patient's family and other persons likely to have been exposed to the patient's infection. She shall follow up all patients who absent themselves from the clinic, and shall impress each new patient with the necessity of continuing proper regular treatment. She shall especially endeavor to make possible the rehabilitation of persons of previously immoral life, working with the official and unofficial agencies to this end. She shall keep a social history record of each case.

There shall be at least one male attendant, who shall assist the doctors with male patients and perform janitor service.

There shall be a clerk, who shall issue attendance cards to patients, keep the record files, and see each day that all records issued are returned. He may be required to typewrite all case records.

Strict discipline shall be maintained among the personnel engaged in the treatment of patients suffering from venereal diseases. The medical officer and the director of the clinic shall impress upon all physicians, nurses, and other attendants who come in contact with the patients, the fact that a dignified and professional attitude must constantly be observed. Joking with patients upon sex subjects should be unthinkable and will not be tolerated, nor will any insinuating remarks or reflections upon the character of any patient be allowed. Undue familiarity of any kind will be sufficient cause for instant dismissal. The medical officer and the director of the clinic shall endeavor to promote a hopeful and inspiring atmosphere in every clinic, maintaining toward the patients a humane attitude combined with the scientific spirit. In this the nurse and social service worker can be of the greatest aid.

When it is impossible to secure the services of separate individuals for all of these positions, it may be possible to secure one or more on part time, as, for instance, a nurse who will attend only the clinics for female patients. It may also be possible, until the clinic has grown, to have one person fill several offices, as, for example, the nurse may act as social service worker and clerk. Volunteer assistance should be made use of when possible. Individuals or organizations may place at the disposal of the clinic the services of a man for janitor service or a part time clerk, etc. But all persons, paid or unpaid,

shall be under the director of the clinic and shall conform to these regulations. If there are well qualified social organizations in the city, such as an associated charities or visiting nurse society, the clinic shall cooperate fully with them.

2. *Equipment.*—The clinic shall be established in a decent location. There shall be not less than two rooms. If possible, there shall be separate waiting rooms for male and female patients. If the clinic is of large size, there should also be separate treatment rooms for male and female patients. The races shall be separated or not, according to local custom.

The following list of instruments and supplies are expected to be adequate:

APPARATUS AND INSTRUMENTS.

1 operating table.
1 to 4 cheap wooden treatment tables.
1 instrument cabinet.
1 two-piece sterilizing outfit.
2 waste receptacle buckets.
1 office treatment stand.
1 Salvarsan outfit, with two 250-cc. glass containers, rubber tubing.
2 two-way stop cocks.
2 300-cc. glass-stoppered mixing cylinders, graduated.
1 dozen Schreiber thumb needles.
1 Record syringe, 5 cc.
6 Record syringes, 1 cc.
3 Record syringes, 2 cc.
2 dozen 1¼-inch No. 21 steel needles.
1 bandage scissors.
3 knives.
6 hæmostats.
2 pair scissors.
2 pair tissue forceps.
1 needle holder.
1 dozen assorted needles, catgut, silk, etc.
3 dozen finger cots.
1 dozen pair rubber gloves.
1 Janet syringe, 100 cc.
1 dozen olivary bougies.
1 dozen French olivary bougies.
1 dozen Porgas olivary bougies.
6 filiform bougies.
6 filiform bougies, whalebone.
1 dozen Gonley's bougies.
1 Valentine irrigator.
1 Keyes-Ultzmann urethral syringe.
6 Fowler sounds.
12 Van Buren sounds.
6 female catheters.
1 dozen assorted rubber catheters.
1 Dickinson female double-flow catheter.
1 cysto-urethroscope.
1 urethroscope.
1 Kollmann dilator.
1 vaginal speculum.
1 uterine forceps.
6 sediment glasses.
1 Bausch & Lomb microscope, with Nos. ⅓, ⅙, and 1/12 lenses.
1 Bausch & Lomb dark field condensor.
1 Bausch & Lomb dark field illuminator (full equipment, with two extra boxes of carbon).
10 dozen 100-cc. bottles.
10 dozen 180-cc. bottles.
5 dozen 60-cc. bottles.
2 pounds corks.
3 glass rods.
2 basins with covers for sterilizing purposes.
1 Bunsen burner.
5 feet rubber hose.
500 test tubes, regular size.
3,000 wooden tongue depressors.
2,000 wooden applicators.
3 card-index systems:
A—Patients by name and number.
B—Patients by dates and name.
C—Patients by diagnosis and number.
History cards.
1 platinum loop.
1 dozen 2-liter flasks.
1 dozen 1-liter flasks.

DRUGS AND SUPPLIES.

10 pounds hydrogen peroxide.
5 pounds phenol.
5 gallons alcohol.
2 pounds potassium permanganate.
5,000 formin tablets, 5 gr.
1 pound iodine crystals.
5 pounds thymol iodid.
1 ounce silver nitrate.
1 pound calomel powder.
10 pounds 1 and 2 inch gauze bandages.
500 yards surgical gauze for dressings.
20 pounds sterile absorbent cotton.
10 gallons Mistura copaibæ compositus, N. F.
Desirable additions:
High-pressure steam sterilizer.
Hot-air sterilizer.
Small incubator.
2 pounds corrosive sublimate tablets.
2 pounds argyrol.
2 pounds protargol.
1,000 glass slides.
1,000 cover slips.
Cedar oil.
5 pounds mercury salicylate, $\frac{1}{2}$ to 1 per cent in sterile liquid petrolatum, made up in 100 cc. wide mouth, shallow bottles.
50 pounds Unguentum hydrargyrum, U. S. P., 50 per cent.
1,000 ointment boxes, 1 ounce.

Inventories shall be taken every three months and copies sent to this office. It is desirable that the urethroscope be used whenever indicated for diagnosis or treatment, where the clinicians possess the requisite skill and training for this work. The medical officer shall assist them to develop the most exact clinical methods, and shall endeavor to secure additional equipment if necessary.

3. *Clinic hours.*—The clinic shall be open daily for as long a period as necessary to adequately treat all cases, and on at least four evenings each week—after 5 p. m. Patients who can attend by day should do so. It is specially desirable that women patients should not be required to attend evening clinics. If this is necessary, they should be treated first in order that they may leave for home as early as possible. If separate waiting rooms can not be provided for female patients, they should, if possible, have separate hours.

4. *Laboratory.*—The medical officer shall make arrangements with a qualified local laboratory, or with the State board of health, for the examination of specimens. Smears for gonococci and blood specimens for Wassermanns shall be procured in all cases, both for diagnosis and as a guide to treatment. Subsequently, similar specimens shall be taken in all cases before final discharge, as stated below. In order to discover as many as possible of the latent cases, every case of gonorrhea shall have one or more blood Wassermanns taken, and every clinical case of syphilis shall have prostatic (or cervical and urethral) smears examined for gonococci. Every genital sore, and suspicious sores elsewhere, shall be examined repeatedly for spirochetes, and all such cases as are negative shall have a blood

Wassermann taken weekly for six weeks before being pronounced nonsyphilitic. Uranalysis shall be made before every administration of arsphenamine, at frequent intervals in all cases receiving mercury, and whenever otherwise indicated.

5. *Records.*—Accurate and legible records, on forms provided for the purpose, shall be kept of all cases applying for diagnosis or treatment. These records shall be carefully filed and protected from harm. This is necessary not only because of their value to the State board of health and to the clinic, but because the Public Health Service desires to use them in its future studies of the venereal diseases. These records shall include history, symptoms, and physical signs on admission, condition and treatment at each visit, and final result; also reports of all laboratory and other special examinations, and the reports of the social service worker, visiting nurse, and others dealing with the case, including a report on the source of infection, home conditions, and to what agencies, if any, the case was referred.

6. *Educational measures.*—The doctor, nurse, and social service worker shall fully inform all patients of the seriousness of their disease, the necessity of treatment until cured, and the precautions necessary to prevent the spread of their disease to others. In addition, they shall give the patient literature on the venereal diseases, approved by the State board of health and Public Health Service. Occasional lectures to groups of male or female patients, separately, may profitably be given. Posters, stating some of the essential facts concerning the venereal infections, should be placed on the walls of the waiting rooms. These should emphasize particularly the hopefulness for ultimate cure if treatment is faithfully adhered to. Clinics which reach large numbers of foreigners should secure posters and literature printed in the languages of their patients. The medical officer shall inform this office of such needs.

7. *Hospital cases.*—The medical officer shall make arrangements with local hospitals, or, if necessary, in the nearest large city, for the care of patients needing hospital treatment. Urological and gynecological operations, and intraspinal injections for syphilis of the nervous system, shall not be attempted, except in cases of the greatest emergency, unless authorized in writing by the medical officer, and then only after being transferred to a hospital approved by him. Milder cases, needing short periods of bed treatment, may be accommodated in a nursing home, or in their own homes under the care of a visiting nurse.

8. *Regulations regarding arsphenamine.*—Arsphenamine shall be administered to every case of syphilis, where there are no contraindications, but not until after a positive Wassermann has been obtained, or the spirochetes found, or until the medical officer has

authorized it in writing because the case is clinically one of undoubted syphilis. The results shall be checked up by frequent Wassermann examinations. Arsphenamine shall be given only by the director of the clinic or by a qualified physician under his direction.

Requisitions for arsphenamine shall be made by the medical officer and countersigned by the State health officer. Requisitions by telegraph for the use of clinics will be honored, but they shall in every instance be later confirmed by the letter of requisition.

Every dose of arsphenamine shall be accounted for on blank forms which will be sent at the same time that the first requisition for this drug is honored. In no instance will the Public Health Service furnish arsphenamine for distribution to private physicians. The responsibility for the administration of the drug furnished to clinics will be placed directly upon the shoulders of the medical officer. Therefore it is expected that this officer will exercise every necessary precaution in organizing clinics for joint State and Public Health Service supervision.

9. *Discharge of patients.*—In addition to the standards for the discharge of carriers, as given in Reprint No. 477, from the Public Health Reports, July 19, 1918, pages 1189–1190, the following order of examination is suggested for discharging a cured patient, as well as for admitting a new one:

EXAMINATION OF MALE PATIENTS.

History taken on first visit.
Inspection of external genitals and joints.
Urethral smears taken for microscopic examination.
Two-glass test of urine.
Prostate and vesicles palpated per rectum, and expressed material collected on a glass slide for gross and microscopical examination.
Examination of urethra for stricture by passage of bougie à boule No. 26 or 28.
Endoscopic examination of anterior urethra; posterior examination in special cases.

EXAMINATION OF FEMALE PATIENTS.

History taken on first visit.
Inspection of external genitals and joints.
Smears from the urethra, and ducts of Skene's and Bartholin's glands, for microscopic examination.
Vaginal examination through a speculum.
Smears taken from external os and posterior vault of vagina.
Bimanual examination of pelvic organs.

The patient should take vigorous exercise on the date previous to the examination, and males should not void urine for at least two hours before the examination. Even though there are no gonococci

in the material expressed from the prostate and seminal vesicles, the patient should not be regarded as cured if there are more than a very few leucocytes present.

The discharge of a venereal patient as cured or noninfectious is an act to be seriously regarded both from the standpoint of public health and human happiness, and the examining physician should be fully aware of the responsibility resting upon him.

10. *Administration of early or prophylactic treatment.*[1]—Every extramarital intercourse is to be regarded as an exposure to venereal infection, and the so-called *prophylactic* treatment is really *early* treatment given without waiting for definite diagnosis.

Such treatment is very efficacious in preventing the development of venereal infections if given within the first hour after exposure. Its value rapidly diminishes from then on, and when four hours have elapsed since the exposure it is of very little usefulness. It should, however, with this understanding, be given up to at least ten hours after exposure.

Cases applying at a later time than this should be instructed to bathe thoroughly with soap and water, and, in the case of females, also to take a douche. All persons giving a history of exposure should report at the clinic for examination every other day for 10 days, and after that weekly for 2 months, in order that any infection may be detected at the earliest moment, and they should be instructed themselves to watch for suspicious symptoms. It should always be remembered that complete control of the patient is necessary in order to obtain satisfactory results from early or prophylactic treatment.

MALES.

Have patient empty the bladder.

Wash the genitals and adjacent parts with soap and water, followed by a 1–2,000 bichloride solution. Dry the parts thoroughly.

Inject a 2 per cent protargol solution, or a 10 per cent argyrol solution, freshly made, into the urethra, enough to distend it moderately, and see that the patient holds the solution for five minutes before expelling it.

Anoint the whole of the penis and scrotum with 33 per cent calomel ointment, rubbing in thoroughly, using special care about the folds of the frenum, foreskin, and scrotum and taking at least 10 minutes for the operation. Cover with oiled silk or waxed paper,

[1] It is not designed to establish prophylactic or early treatment stations primarily as such, but all clinics should be prepared to intelligently administer this treatment to voluntary applicants who give a history of exposure within a few hours immediately preceding their application.

and allow to remain for several hours before washing the parts. Since the water content of the base renders the calomel more active, it is important that the ointment be made with lanolin instead of the fats usually employed for salves. Care should be exercised that the lanolin is not anhydrous.

FEMALES.

In cases of rape, and some others, there may be occasion for applying early treatment to females. If such occasion should arise, the following procedure is suggested:

Have patient empty the bladder.

Place patient in lithotomy position. Wash the genitals and adjacent parts with soap and water. Give a douche of 2 quarts of sterile water, temperature 100° F., followed by 2 quarts of 1–2,000 bichloride solution, and wash external parts with the latter. Dry vagina and vulva by sponging.

Swab entire vagina, through a speculum, with a 2 per cent protargol solution, or 10 per cent argyrol solution, freshly made; reach every fold and especially the posterior vault and external os. Swab entire vulva in the same way, reaching every recess and manipulating the mucous membrane at the urinary meatus and at the vaginal orifice so as to facilitate the entrance of the solution into the openings of the ducts of Skene's and Bartholin's glands. Inject enough of the same solution into the urethra to distend it moderately, and have the nurse hold a small sponge in a dressing forceps firmly against the meatus to retain the solution for five minutes. Cover vulva with pad and let patient wait in the clinic for 15 minutes, recumbent, if possible.

Douche vagina and vulva with a small amount of sterile water, and sponge dry. Apply calomel ointment to the cervix, vagina, vulva, and adjacent parts, rubbing thoroughly into the recesses and folds of the mucous membrane and skin, and taking at least 10 minutes for the operation. Cover external parts with oiled silk or waxed paper and instruct patient to allow ointment to remain for several hours before washing the parts.

The nurse, after being carefully instructed, shall apply the calomel ointment in the early treatment of female cases.

11. *Standards of treatment for venereal diseases.*—No definite rules will be laid down relative to the manner of treating diagnosed venereal diseases. It is, however, desirable that the clinics should follow universally recognized standards and approved methods. It is suggested that the Manual of Treatment of the Venereal Diseases, issued by the Surgeon General of the Army, be used as a guide

for the treatment of these cases in men. In the meantime, the bureau has under preparation a manual, based upon the foregoing, which will also include a section on the treatment of venereal infections in women.

12. *Publicity.*—Every venereal disease clinic should be given proper publicity by explaining its purpose to the local medical profession, officials, police authorities, draft boards, officials of rescue societies, Young Men's Christian Associations, associated charities, and other similar organizations. Signs placed in public toilets have proved a valuable measure, and in the larger cities an advertisement in the newspapers may at frequent intervals be placed among those of the advertising "specialists." In addition, State boards of health should be encouraged to take all possible measures for the suppression of quack advertisements.

13. *Financing the clinics.*—The medical officer shall organize venereal disease clinics so far as possible with local funds. For that purpose it is best to visit a number of towns, spending only one or two days in each, for the purpose of meeting the officials and leading citizens and explaining to them the purposes and plans of the proposed clinic. The medical officer shall also at this meeting make a clear statement of the estimated expenses and request an appropriation for the funds needed to establish the clinic. In most cases it will be possible to secure this appropriation, or a definite promise of it, on the same day.

On this first visit the medical officer should inspect possible locations and quarters for a clinic. He should, if possible, already have tentatively selected a local physician for director of the clinic by consulting with State health officials and others and by correspondence. If this man appears to be suitable and is willing, he should be appointed and requested to select the other members of the staff for approval by the medical officer, if so desired by the latter.

The medical officer can then save time by proceeding to the next town, and so on for perhaps two weeks. He should then return over the same route and complete the organization of each clinic, approve its location, order its equipment and supplies, appoint the staff, and arrange for the advertisement of the clinic.

In order that each town shall be made to feel that the clinic really belongs to it and is for its service, it is highly desirable that a responsible and broad-minded business man shall act as its fiscal officer. It would be his duty to raise additional money for extending the work of the clinic, approve appointments, pay roll and accounts, make disbursements in payment of duly authorized expenditures, and report monthly on the financial status of the clinic to the medical officer.

LAW ENFORCEMENT AND SOCIAL SERVICE.

Law-enforcement work is to be directed toward apprehending persons who willfully and negligently expose others to infection with the venereal diseases, and toward removing conditions favorable to the activities of such individuals. This work shall be carried on in the closest cooperation with the local, State, and Federal law-enforcing authorities, with recognized volunteer agencies, and especially with the representatives of the Commissions on Training Camp Activities of the War and Navy Departments.

Medical officers are informed that the Department of Justice will pay the entire cost of subsistence and medical treatment of United State prisoners while serving sentence. Many United States prisoners confined in local jails and county hospitals are suffering from venereal diseases. The Department of Justice is earnestly desirous that these patients should receive adequate treatment during their terms of imprisonment, so that they may be cured, or discharged in a noninfectious state, if possible. If this is not possible, it is desirous that these prisoners should receive adequate supervision and treatment after their release, to insure that they will not be a danger to the community to which they go.

The Department of Justice and the United States Public Health Service are cooperating harmoniously to this end. The Department of Justice has issued the following instructions to all United States marshals:

First. That they shall instruct jailers and jail physicians to provide for the adequate treatment of such venereally diseased prisoners during their sentence.

Second. That they shall instruct jailers to notify Public Health Service officers in charge of extra cantonment zones where there are such officers, and otherwise the State health officers, four or five days before the release of such infected prisoners.

Third. That the Department of Justice will authorize reasonable and necessary expense in the treatment of venereally diseased patients.

The above plans were made before it was apparent that the Public Health Service would have any other than the extra-cantonment officer for venereal disease control. The medical officer, therefore, is directed to confer with the United States district judges, United States attorneys, and United States marshals having jurisdiction in his area with a view to establishing the necessary cooperation between his office and the Department of Justice in the matter of venereal disease control. In this connection he shall ask to be shown a copy of circular letters 812 and 813, Bureau of Investigation, Department of Justice, which the Attorney General has sent to all these officials.

He shall make it plain that the State department of health and the United States Public Health Service desire only one thing in this matter, and that is the adequate treatment of all venereally diseased prisoners. In many places this is at present impossible on account of lack of facilities in the jails and other places of confinement. The medical officer shall therefore offer to the United States marshal in his area all the facilities at his disposal for the treatment of such prisoners. It should never be the case that prisoners are deprived of treatment in near-by, well-equipped venereal disease clinics because of a lack of amity between the medical officer and the United States marshal or other officers. On the contrary, it should be possible and practicable for jailers to make the fullest use of such clinics. Further, upon the release of infectious cases, the medical officer should have in his possession such information as may be necessary to enable him to deal with each case according to the regulations of the State department of health.

The medical officer shall also work in the closest cooperation with the women representatives of the Section on Women and Girls of the Commission on Training Camp Activities, especially in the problem of rehabilitating as many as possible of the persons coming under their care, making the best use also for this purpose, of the social service workers of the clinics. He shall see to it that the moral atmosphere of clinics, hospitals, detention homes, etc., is constantly hopeful, inspiring, and as normal as possible. Inmates of hospitals and detention homes shall be provided with work and healthy interests, so far as practicable, during their residence, and the medical officer shall confer with the local military authorities and others with regard to procuring suitable employment. The Reformation and Conservation Division of the Quartermaster's Department affirms that women can render valuable service to the Government by repairing articles of clothing which would be turned over to them through the local quartermaster's department. Should such a procedure appear advisable, the medical officer is directed to cooperate with the local military authorities to that end. Other local agencies may also be able to furnish material for the employment of both men and women.

If infected persons under detention are thus employed, every precaution must be used to avoid the transmission of infection from one worker to another, and articles upon which they have been working should be returned in such condition that no possibility of infection through them can exist.

EDUCATIONAL WORK.

Much is to be expected from educational work on the venereal diseases and social hygiene. The experience of the Army and Navy

alone shows the efficiency of this phase of the work. It must therefore be given due importance, but extremes are to be most carefully avoided.

This work is to be done by lectures, literature, posters, moving pictures, and by the personal conversations of the clinic staffs and other judicious persons who may become qualified. If the State board of health has published literature on the venereal diseases, arrangements should be made for distributing it in connection with the clinics, public lectures, etc. The Public Health Service, as stated in the beginning, is developing all sides of this educational work, and the medical officer should freely make his needs known to this office. All suitable citizen organizations should be interested in the problem both from the standpoint of health and morals. It will be found generally true that the organizations of business men, the women's clubs, school boards, religious bodies, etc., will readily respond to a reasonable appeal for assistance and cooperation in educating the people of the State as widely as possible. Facts should be adhered to and no exaggerations permitted under any circumstances or for any purpose. It will be best always, in referring to the wide prevalence of these diseases, to emphasize strongly the fact that measures for their control are only now for the first time being put generally into effect; and that with the thorough education of the public with regard to these diseases, and the increasing application of other public health measures to them, there is every reason to believe that their prevalence will be reduced in the future. Parallels can be drawn between the results to be reasonably expected in this work, and the results that have already been obtained from similar work in fighting tuberculosis, malaria, typhoid fever, and other diseases.

COOPERATION OF DRUGGISTS.

The medical officer shall endeavor to secure the cooperation of the druggists of the State, in accordance with the plans of the Public Health Service. To that end, State associations of druggists should be communicated with and, if possible, letters sent to the individual druggists. If the State has no law controlling the sale of venereal proprietaries by druggists and others, such legislation shall be promoted.

REPORTS.

The medical officer shall report monthly on all of his activities in the State, according to these four divisions:

(*a*) Education.

(*b*) Law enforcement and social service.[1]

[1] Cooperation with all agencies which endeavor to provide proper community recreation facilities should be considered an important part of social service activities for the prevention of venereal diseases.

(*c*) Propaganda to secure funds for clinics, hospitals, detention homes, and reformatories.

(*d*) Establishment of increased facilities for early diagnosis and treatment.

PUBLICATIONS ON VENEREAL-DISEASE CONTROL.

The medical officer should receive with these instructions a number of publications dealing with the control of venereal diseases, and copies of letters which have been used in certain States, and of reports submitted by medical officers showing approved forms. He should also receive copies of educational pamphlets, posters, etc., that can be procured in quantity from the Public Health Service. These should be used in so far as they can be of advantage in his development of State work.

He shall, in his first report, acknowledge receipt of all material, letters, publications, etc., individually, by title or description.

UNITY OF EFFORT.

The medical officer is asked to keep constantly in mind that it is his duty to advance the control of venereal diseases. The machine that he uses for this is composed of many parts that must be kept well oiled and free from grit. Many forces, organizations, and individuals must have a part in his work if it is to attain its greatest success. While each should perform a definite, specified function, and not enter the field allotted to others, they must each be guarded from the temptation to assign too much importance to their own duties and the tendency to assume that other workers should conform to their own ideas. Where their fields of activity touch they should mutually endeavor to assist each other in attaining their common end, rather than jealously insist upon their individual prerogatives.

It is believed that every medical officer, if he determines to do so, can go far toward bringing the different persons concerned into continuously agreeable relations with each other. This applies both to the members of the clinic staffs and to local associations and individuals who can be helpful, and also to the various persons who have a broader connection with the State work in an official or unofficial capacity.

For the purpose of venereal disease control, all of these may be regarded as members of a committee of which the medical officer is chairman. By virtue of his connection with the State board of health and the Public Health Service, and because he is in touch with all the activities within the State, he is in a position to estimate the relative value to the work of the various cooperating bodies. He

can, in a tactful way, keep each within the bounds so determined by him. He should, however, first obtain a clear knowledge of what each such organization is qualified and equipped to accomplish.

As much as possible, he should endeavor to promote the social acquaintance of these various workers who are scattered over the State. They should be organized into several groups in different sections of the State, such that workers from several towns may meet together socially two or three times a month. Representatives of the State and Federal agencies should endeavor to meet with these groups in turn, to keep them in touch with the larger activities. There should also be an occasional general gathering of workers from all over the State to discuss the most perplexing problems of their work and to enjoy social recreation together. This should be at least a two days' meeting, and is recommended just as much for the purpose of promoting friendship between the different workers, as in order that they may be stimulated by learning the latest facts relative to their work and by the free interchange of opinion.

It is peculiarly incumbent upon the medical officer that he should endeavor to inspire everyone with the spirit of enthusiastic cooperation and vigorous faith in the value of this work. There will be times when he must exercise his authority, and he should do this in no uncertain manner, but he should endeavor to make these occasions as few as possible, particularly in dealing with cooperating organizations.

The work itself is bigger than any of us or all of us put together. We are none of us beyond criticism, and we are therefore obligated to work together in as friendly a manner as possible, striving for the success of our common enterprise rather than developing a spirit of criticism. Prestige is of no value except as it helps the work to succeed. It should be the badge not of authority but of service.

DO NOT DESTROY—

When you have no further use for this pamphlet give it to some one else.

○

614.09
Un3m
no.20

Uncle Sam's Guides to Health

A Selected List of Popular Health Leaflets published by the United States Public Health Service

TREASURY DEPARTMENT
THE UNITED STATES
PUBLIC HEALTH SERVICE

Miscellaneous Publication 20

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1919

INTRODUCTION

Experience has thoroughly demonstrated that the prevention of disease is both far easier and much more effective than is the cure once the disease becomes established. Every one, therefore, will welcome a series of authoritative leaflets written in simple nontechnical language which give clear directions dealing with all the important phases of preventive medicine. In the following pages a list is given of the popular health bulletins issued by the United States Public Health Service. This list was prepared especially for the information of soldiers, sailors, marines and nurses discharged from military duty, and is designed to help those who are ill to regain health and strength and to stimulate the interest in public health matters, awakened during their service with the military forces. Copies may be obtained free of charge by writing to the

SURGEON GENERAL,
UNITED STATES PUBLIC HEALTH SERVICE,
WASHINGTON, D. C.

G14.09
Un3m
no.20

Uncle Sam's Guides to Health

The Road to Health. (Keep Well Series No. 1, 16 pages.)

There is nothing mysterious about the prevention of sickness. This pocket-size pamphlet points the way to health in simple, everyday language and gives eighteen helpful rules of hygiene whose regular observance will prove of very material benefit.

Common Colds. (Supplement No. 30, 4 pages.)

Colds are unquestionably the most prevalent disease in America and are attended by large economic loss. Colds are prevented easier than cured if a person only learns how.

Whooping Cough. Its nature and prevention. (Reprint No. 100, 6 pages.)

Whooping cough is one of childhood's common ailments and one that by no means can be considered trivial. This leaflet is written for the general public rather than the medical profession.

Tuberculosis. Its nature and prevention. (P. H. Bulletin No. 36, 16 pages.)

Tuberculosis usually begins most insidiously and many people do not know the warning signs or realize their danger. This illustrated booklet points the way to health.

How to Avoid Tuberculosis. (Keep Well Series No. 3, pocket size, 8 pages.)

The white plague's toll, 150,000 lives annually, would be materially reduced if each person knew his danger and how to combat it effectively. This is literally the ounce of prevention.

Measles. (Supplement No. 1, 8 pages.)

Measles affects more than a million people in the United States each year. Because of the high mortality, especially in young children, and the serious consequences following an attack, the disease is of prime importance as a health problem. Learn how to prevent it.

126986°—19

Diphtheria. (Keep Well Series No. 4, pocket size, 16 pages.)

Diphtheria ranks high in child mortality in spite of remarkable advances in curing and of known ways of preventing it. Ignorance on the part of parents is its greatest ally. This gives the facts.

Scarlet Fever. Its prevention and control. (Supplement No. 21, 18 pages.)

Everyone should be familiar with the facts in this book for there is yet no specific remedy for scarlet fever, and chief reliance, therefore, must be placed on prevention.

Typhoid Fever. Its causation and prevention. (P. H. Bulletin No. 69, 22 pages.)

Medical research has solved most of the mystery once surrounding this deadly disease, its cause, treatment, and prevention. The menace, however, will not disappear until the public avails itself of the facts.

The Transmission of Disease by Flies. (Supplement No. 29, 20 pages, illustrated.)

Swatting the fly is forever popular. Do you know the kinds of flies and the diseases they spread? This pamphlet is a liberal education on "flyology" for the school child or layman.

Safe Disposal of Human Excreta. (P. H. Bulletin No. 68, 28 pages, illustrated.)

An invaluable guide to rural sanitation so far as this most important problem is concerned. Should be read by every farmer and rural dweller.

Sewage from Single Houses. (Reprint No. 504, 8 pages, illustrated.)

Every farm or dwelling, located far beyond municipal sewerage lines may be made sanitary if the directions in this book are followed.

Good Water for Farm Homes. (P. H. Bulletin No. 70, 16 pages.)

Farm water is frequently and needlessly exposed to disease-breeding contamination. This book, with illustrations of sanitary well construction and location, shows how to prevent this.

Malaria Primer. Lessons on its causes and prevention. (Illustrated, 20 pages.)

Education is the most important factor in preventing the "Scourge of the South," which affects nearly eight million persons annually. This is a popular catechism on the causes and prevention of malaria, and is especially designed for use in schools.

Malaria, Prophylaxis of. (Reprint No. 454, 8 pages.)

Quinine is almost as effective in making a person immune to malaria as vaccination is against typhoid. Every person in malarial districts should learn how to use it.

Malaria, Prevention of. (With special reference to screening.) (Reprint No. 170, 8 pages.)

Malaria can't get in if you keep the mosquito out. This leaflet with explanatory illustrations, tells how to screen a dwelling properly.

Oiling as an Antimosquito Measure. (Reprint No. 260, 12 pages.)

Oil is the deadly enemy of the mosquito. These pests are not only responsible for malaria but are quite a nuisance otherwise. Learn how oil kills them.

Safe Milk. An important food problem. (Supplement, No. 31, 24 pages.)

Milk is not only one of the most important foods but at times it may be one of the most dangerous. Impure milk annually ushers thousands of infants to an untimely grave. Every one should understand the relation of milk to disease and how to make milk safe.

Safe Milk for the Small Town. (Reprint No. 497, 8 pages.)

City laws quite frequently guarantee to the consumer a milk that is bacteriologically pure. The small town often lacks this defense. This book tells how to solve the problem in an easy way.

Motherhood. (Keep Well Series No. 8, 8 pages.)

A pamphlet giving helpful advice to the expectant mother.

Breast Feeding Her Baby. (Keep Well Series No. 9, 8 pages.)

Important points to be remembered by all mothers when caring for their babies.

Bottle Feeding for Babies. (Keep Well Series No. 10, 8 pages.)

A concise guide for mothers in a difficult and important subject.

The Care of the Baby. (Supplement No. 10, 14 pages.)

Ignorance on the part of parents sends thousands of infants to their graves each year. This book was prepared for the mother by a committee of the American Association for the Study and Prevention of Infant Mortality.

The Summer Care of Infants. (Supplement No. 16, 16 pages.)

Summer is a sore trial for mothers with young babies. Most of the many infants dying each year die during the warmer months. This is a helpful booklet in preventive medicine and proper feeding.

Homemade Milk Refrigerator. (P. H. Bulletin No. 102, 4 pages.)

This contains illustrations and a description showing how to make an excellent milk refrigerator at home. Especially important when baby is bottle-fed.

Adenoids. (Keep Well Series No. 2, pocket size, 8 pages.)

Ten per cent of all children are handicapped with adenoids, frequently the cause of many grave subsequent developments. Every parent should know what adenoids are and what to do. Give the child a chance.

Cancer. Important facts with which every adult should be familiar. (Keep Well Series No. 4, pocket size, 16 pages.)

In the absence of a specific remedy for cancer it is imperative that the general public learn to appreciate the importance of early recognition and the need for promptly seeking competent medical advice. The facts presented in this pamphlet represent the concensus of the best medical opinion.

Keeping Fit. (V. D. No. 1, 16 pages.)

Man Power. (V. C. No. 6, 16 pages.)

The Parents Part. (V. D. No. 32, 16 pages.)

Three well-considered pamphlets dealing with the important subject of venereal diseases. Others can be obtained on application.

Exercise and Health. (Supplement No. 24, 8 pages.)

This is especially designed for the business man. Most men get too little exercise and suffer too much mental strain. Every person could change this without inconvenience. Learn how.

Indoor Tropics. (P. H. Report Supplement No. 2, 8 pages.)

There are as many pitfalls to health in the overheated dwelling, school, or office building as there are in the tropics. Do you know what is the proper temperature for your home?

The Rat. (P. H. Bulletin No. 103, 12 pages.)

This gives a summary of useful facts concerning the rat menace, and gives practical instruction regarding the extermination of these destructive and disease-bearing pests. Useful for distribution in clean-up campaigns.

Rat Proofing. (Reprint No. 122, 24 pages.)

The rat is one of America's most expensive "luxuries." He is also a disease carrier. Everyone is anxious to get rid of him but few know how. This book, with numerous illustrations, gives a practical solution for the problem.

Hay Fever and Its Prevention. (Reprints No. 349 and No. 412.)

Helpful advice and information for those who suffer from this distressing malady. The bulletins contain excellent pictures, some in color, showing the weeds responsible for the condition. Reprint No. 412 is written especially for those living in the Rocky Mountains and Pacific States.

The Safe Vacation. (Keep Well Series No. 5, pocket size, 32 pages, illustrated.)

Where to go and what to do to get the utmost benefit from your vacation at the seashore, the mountains, down on the farm, or camping out. Complete instructions in first aid in cases of drowning and other emergencies. Illustrated.

Health Almanac. (Public Health Bulletin No. 98, 42 pages.)

The death knell for the patent medicine almanac. Contains all of the essential facts found in these publications with none of the quackery. Sound advice in preventive medicine and care of the sick.

Check publications desired, write name and address in space provided, and forward to *Surgeon General, United States Public Health Service, Washington, D. C.*

The Road to Health. Keep Well Series No. 1.
Common Colds. Supplement No. 30.
Whooping Cough. Reprint No. 100.
Tuberculosis. Public Health Bulletin No. 36.
How to Avoid Tuberculosis. Keep Well Series No. 3.
Measles. Supplement No. 1.
Diphtheria. Keep Well Series No. 4.
Scarlet Fever. Supplement No. 21.
Typhoid Fever. Public Health Bulletin No. 69.
Transmission of Disease by Flies. Supplement No. 29.
Disposal of Human Excreta. Public Health Bulletin No. 68.
Sewage from Single Houses. Reprint No. 504.
Good Water for Farm Homes. Public Health Bulletin No. 70.
Malaria Primer.
Malaria, Prophylaxis of. Reprint No. 454.
Malaria, Prevention of. Reprint No. 170.
Oiling as an Antimosquito Measure. Reprint No. 260.
Safe Milk. Supplement No. 31.
Safe Milk for the Small Town. No. 497.
Motherhood. Keep Well Series, No. 8.
Breast Feeding Her Baby. Keep Well Series No. 9.
Bottle Feeding for Babies. Keep Well Series No. 10.
Care of the Baby. Supplement No. 10.
Summer Care of Infants. Supplement No. 16.
Homemade Milk Refrigerator. Public Health Bulletin No. 102.
Adenoids. Keep Well Series No. 2.
Cancer. Keep Well Series No. 6.
Keeping Fit. Venereal Diseases No. 1.
Man Power. Venereal Diseases No. 6.
The Parents' Part. Venereal Diseases No. 32.
Exercise and Health. Supplement No. 24.
Indoor Tropics. Supplement No. 2.
The Rat. Public Health Bulletin No. 103.
Rat Proofing. Reprint No. 122.
Hay Fever and Its Prevention. Reprint No. 349.
Hay Fever. Reprint No. 412.
The Safe Vacation. Keep Well Series, No. 5.
Health Almanac. Public Health Bulletin No. 98.

Name.....

Address.....

City and State.....

○

WHAT TO DO IN ACCIDENTS.

IN CASE of accident or sudden grave illness, humanity demands that those who happen to be present should take all possible measures for the relief of the afflicted person. It is entirely possible for any person of ordinary intelligence to master enough of the art of first aid to be able to give a great deal of valuable assistance pending the placing of the patient under regular medical care, and such help, if properly and promptly administered, may frequently in severe cases be the means of actually saving life. When a person is hurt or suddenly becomes sick it is almost as important to know what not to do as it is to know what to do, for ignorant volunteer assistants have often done their friends more harm than good by their ill-advised treatment. Knowledge of what is best to do in such emergencies can only be obtained by some training and the use of a great deal of common sense. It is therefore desirable that everyone should spend a moderate amount of time in studying at least one of the various manuals which have been prepared on this subject.

GENERAL RULES AS TO WHAT TO DO IN CASE OF ACCIDENT.

The conditions under which accidents happen vary so much that it is difficult to lay down rules which will be broad enough to cover all cases, but there are certain principles which should be followed in a general way when disasters of this sort occur.

First. A rapid preliminary survey of the person should be made to determine what must be done, first of all, in any particular case.

This preliminary examination should endeavor to ascertain whether the injuries can properly be classified as serious or trivial. If the person is conscious, this information can be at once obtained upon inquiry. If unconscious, the nature of the accident will almost always decide as to the probable gravity of the case.

Second. Note quickly the surroundings.

This is for the purpose of deciding on how soon additional help can be obtained and whether the individual is in danger of further injury from the nature of the place in which he is. A person may be hurt by a falling building, or be found in a room filled with gas, and it may be likely that further injuries may be received from the same source unless he is immediately moved, or it may be perfectly proper to permit him to remain for the present where the accident occurred.

Third. Now make a more careful examination of the patient to determine the location and nature of the injury.

Frequently in case of accident a glance at the injured person will be sufficient to determine where and how he is hurt. One leg may be doubled up in an unnatural position, part of the clothing may be torn or marked, as by the black streak left by a car wheel, or blood may be appearing on some part of the body. It may be necessary to partially undo some of the clothing to ascertain more correctly the amount and source of bleeding.

If the patient is unconscious, note the color of the face and the condition of the skin; take the pulse, examine the eyes, feel the head for a possible fracture of the skull, and observe the manner in which the patient is breathing, especially watching for puffing of the lips.

Fourth. Determine the proper course of action under the conditions present.

Having gotten some idea as to the nature and extent of the injuries, the amount of help available, and the general circumstances of the accident, all of which should not consume more than a minute or two, it is necessary to lay out and follow a definite plan of procedure, which will depend upon the data which has been obtained. If the person is bleeding very rapidly, that must be attended to without further delay. If the loss of blood is not alarming, one can then proceed along the following lines:

If a doctor is within easy reach it may not be necessary to do more than to send one of the bystanders for him and make the patient as comfortable as possible pending his arrival. In sending for the doctor it is always best to give him as complete a statement of the nature and extent of the injury as is practicable. Then the doctor will know what instruments and other materials to bring with him. If circumstances permit, this information may be given in writing. If plenty of help is at hand another messenger should be immediately detailed to inform some one in authority of the accident. In a shop this would be the foreman of the shop or the superintendent of the plant; on board ship, the captain; in the street, the nearest policeman or police headquarters should be notified.

If the person is in a dangerous place or exposed to severe weather, it may be necessary to move him. If the danger is very imminent, this must be done at once, but all possible precautions should be taken to avoid increasing the damage already done, especially if there are any broken bones. In moving a person with a fracture the sharp ends of the bone may tear the flesh and even be driven out through the skin, creating a compound fracture, which is much more dangerous than a simple one. Having moved the patient, if absolutely necessary, or if it is decided to allow him to remain where he is pending the arrival of medical help, proceed to administer first aid, being guided by the following suggestions:

1. PLACE THE INJURED PERSON IN A PROPER POSITION.

Tight collars or belts should be loosened. The person should usually be kept lying down, or resting comfortably in a sitting position. If the face is pale, lower the head and have the person lie horizontally. If the face is flushed the head may be raised on a folded coat, blanket, or other suitable material. If vomiting occurs, turn the head to one side so that the vomited matter will run out of the mouth and not flow down the windpipe, which may cause choking, and later, on inspiration, pneumonia. Do not attempt to force unconscious persons to drink water or stimulants, as they can not swallow.

2. REMOVE CLOTHING.

In removing a coat or shirt to determine the amount of injury take the clothing off of the sound side first, and then it can be more easily removed from the affected part. This will avoid the danger of disturbing a fracture. It is sometimes advisable to cut the clothing off. In such a case cut along a seam or rip up a seam. Always cut the clothing when it is necessary to examine a badly injured or crushed limb.

In removing the clothing have a due regard for the proprieties and do not expose the patient unnecessarily.

3. TREAT THE MOST DANGEROUS CONDITION FIRST.

Always check serious hemorrhage before doing anything else. Put some sort of a dressing on a compound fracture before applying splints. Treat shock before dressing extensive burns. Be prepared to improvise headrests, tourniquets, splints, dressings, and stretchers out of material available.

4. PROTECT WOUNDS.

All wounds should be covered promptly with some sterile material, or if that can not be obtained the wound should be exposed to the air and the clothing fastened back out of the way, so that it will not rub against the wound or all over it.

5. BE ON THE LOOKOUT FOR SHOCK.

In severe injuries always examine for shock and administer suitable remedies if symptoms of shock are present. In this connection remember that keeping an injured person warm is of great importance even though he is not in shock. It is a general rule in first-aid work to keep the head cool and the feet warm.

6. HANDLE THE CROWD.

Always see that the patient has sufficient air. Keep the crowd back and do not permit the curious or overzealous to disturb the patient. Objectionable bystanders who are needlessly exciting the sufferer can

often be gotten rid of by sending them on errands, even if the errand is unnecessary.

WOUNDS.

DESCRIPTION.

Injuries in which the skin has been opened, torn, or punctured are called wounds.

Severe wounds may inflict great damage to the muscles, bones, vessels, or internal organs, but in all wounds there is a secondary danger that severe inflammation may follow. The likelihood of inflammation exists in small wounds as well as large ones; hence all wounds must be handled carefully to avoid this complication, as even a trivial injury like the prick of a pin has been known to result in death from this cause.

It is a matter of everyday experience that countless little cuts and scratches which every person receives during a lifetime almost always heal without trouble, no matter whether treated or not. It is also well known that occasionally these small injuries, and more often the larger ones, do not do well. The wound becomes red and painful, it throbs, the edges swell, and finally matter develops. This matter is called "pus." When the matter escapes the pain ceases and the cut gradually heals. At other times the redness rapidly spreads, and in a short time the entire arm or leg, as the case may be, becomes involved. Taken at this stage, prompt and vigorous surgical treatment may produce a cure, but if neglected the condition steadily grows worse and sometimes ends in death.

GERMS CAUSE INFLAMMATION.

Wounds become inflamed because disease germs have gained a foothold. These germs or bacteria are the smallest of all living things. Even when magnified by a powerful microscope they are not the fierce-looking animals with eyes, teeth, legs, etc., which are frequently represented in the newspapers, but in reality plants of the simplest kind. These minute plants occur in various forms; some resemble balls, others rods, and a few are spiral in shape similar to a piece of broken corkscrew. Like all other plants, they require warmth, water, and food in order that they may grow and flourish. All bacteria can be killed by heat and certain powerful chemicals, such as tincture of iodine, carbolic acid, or bichloride of mercury.

Bacteria multiply by the simple process of dividing into two. A groove forms around the germ; it gradually becomes deeper, finally cuts the germ into two parts, and in a short time there are two bacteria where there was one before. Under favorable circumstances this process of division may occur in as short a time as 20 minutes.

VARIETIES OF WOUNDS.

1. *Incised wounds.*—These are wounds in which the skin or tissues are cleanly cut with a sharp instrument.

2. *Lacerated wounds.*—Lacerated wounds are caused by some blunt instrument which tears and bruises the flesh.

3. *Punctured wounds.*—Punctured wounds are produced by narrow sharp-pointed instruments, such as nails, daggers, or bayonets. Bullet wounds are also included under this classification.

Many wounds are infected at the time they are received, because the knife or other instrument has bacteria on it and these were left in the flesh.

GENERAL PRINCIPLES OF THE TREATMENT OF WOUNDS.

From what has been said concerning the action of bacteria on wounds, it is evident that great care must be exercised in handling or dressing these injuries to prevent the introduction of living germs.

Sterilization.—The best way to kill bacteria is with heat. All dressings, instruments, and other substances which are used in wound dressing are therefore first heated, generally by boiling water or steam, and are then said to be *sterile.*

Preparation or sterilization of the hands.—The person who dresses a wound should thoroughly scrub his hands for five minutes with a nail-brush, hot water, and soap. Then the finger-nails should be cut short and the spaces under the nails thoroughly cleaned out, after which the hands and nails are again scrubbed for five minutes. After the second scrubbing the hands should be rinsed in clean water and soaked for several minutes in a solution of one to two thousand of bichloride of mercury, a 3 per cent solution of compound cresol, or a mixture of 2 parts of grain alcohol with 1 of water.

Sterile dressings.—Whenever possible, all dressings which are to be used on wounds should have been previously treated with heat so as to kill the bacteria.

Germicides and antiseptics.—Chemicals which will kill bacteria are called germicides. Tincture of iodine and carbolic acid are good germicides. Certain substances, while they are not able to kill bacteria to any great extent, can prevent them from growing, and such chemicals are known as antiseptics. A solution of boric acid is a good illustration of an antiseptic.

DISINFECTION OF WOUNDS.

If the wound is reasonably clean it is much better to simply apply tincture of iodine. This is done by taking a clean match or tooth-pick, twisting a small amount of cotton around the end to make a swab, dipping the swab in the iodine, and applying a light coat first

to the wound and then to the surrounding skin. When dirt and other substances have gotten into the injury, however, it is necessary to remove them.

In an emergency, if it is necessary to place the hands in the wound without washing, they should be covered with several thicknesses of sterile gauze, as this will assist in preventing infection of the wound. After picking out the gross particles of dirt the wound may be cleansed by flushing it with a suitable solution and scrubbing with pieces of sterile gauze. For this purpose use freshly boiled and cooled boric-acid solution made by stirring a heaping tablespoonful of powdered boric acid into a pint of hot water, or a 1 to 5,000 bichloride of mercury solution, or a 3 per cent compound cresol solution. Be careful about disturbing blood clots in wounds because this may start bleeding afresh.

HYDROGEN PEROXIDE.

The practice of applying hydrogen peroxide to fresh wounds is not recommended as a routine practice. It causes a great deal of pain, wets the wound, and is not an efficient germicide. Hydrogen peroxide may be used sometimes to check hemorrhage or to clean up an old leg ulcer, but it should not be applied to other wounds except on advice of a physician.

FIRST-AID PACKETS.

Small packages properly sealed and protected containing sterile materials for dressing a wound are carried by all soldiers and are often kept on hand for emergencies in factories, on trains, etc. Various kinds of first-aid packets are on the market, but an excellent one is supplied by the American Red Cross.

TREATMENT OF CUTS.

Small cuts.—Bleeding is beneficial as it serves to wash out bacteria. After hemorrhage has ceased, paint the wound and the surrounding skin for a considerable distance with a light coat of iodine. Apply a dressing of sterile gauze or freshly laundered muslin and hold in place with a bandage. A sterile gauze bandage makes a convenient dressing for small injuries around the fingers or hand. A piece of the bandage may be folded into a compress, or the bandage alone simply wrapped around the finger, care being exercised so that the part which goes next to the wound is not touched by the operator.

Large cuts.—These are apt to bleed freely, but unless an artery or large vein has been opened, the hemorrhage will in most cases cease of itself.

First-aid treatment.—Send for a doctor. If the blood comes in spurts apply a tourniquet. While waiting for the physician make the

patient comfortable and see that the clothing does not come in contact with the wound. If the patient has to be transported before medical help can be obtained, cover the wound with a number of thicknesses of sterile gauze, boiled dry muslin, or similar material. If these are unobtainable, use some freshly laundered article such as a clean handkerchief, towel, or napkin. Hold the dressings in place with a bandage.

LACERATED WOUNDS.

Most of these wounds are infected with bacteria at the time the injury is received, but severe bleeding is rare.

First-aid treatment.—Check hemorrhage if necessary. Send for a doctor. Cover the wound with a sterile dressing, making no attempt to disinfect it. While awaiting the arrival of the physician, make the patient as comfortable as possible and treat shock, if it is present. If no sterile dressing is available, leave the part exposed to the air but take care that nothing touches the wound. Treat crushes of the hand, arm, foot, or leg in the same manner.

PUNCTURED WOUNDS.

Punctured wounds are especially dangerous because bacteria may be carried deeply into the tissues where conditions are very suitable for their growth. Lockjaw not infrequently develops from such such injuries. Always examine the article which inflicted the injury to determine if the end may have been broken off in the wound.

Treatment.—An effort should be made to disinfect the wound with tincture of iodine. Take a toothpick and twist a small amount of cotton around one end. Dip it in the iodine. Then push it down to the bottom of the wound and work the iodine thoroughly into the tissues. Paint the surface with tincture of iodine and apply a sterile dressing. All these patients should be taken to a doctor to have him determine whether injections of antitetanus serum are necessary to prevent lockjaw.

INFLAMED WOUNDS.

Symptoms.—Sometimes after a wound has been received and dressed all goes well for a day or two and then the wound becomes painful and begins to throb. If the wound is extensive, the patient has fever, the tongue is coated, and there is considerable constitutional disturbance. In such cases a physician should be called at once. If no physician is available the dressing should be removed and the wound inspected. The edges will probably be swollen, dry, and stuck together and there will be a diffuse redness of the skin surrounding the injury. It will be necessary to open the wound sufficiently to allow the matter which is forming within to escape. This

can be done by boiling a probe, a hairpin, or some small blunt instrument, and then gently inserting it between the edges of the wound and opening them slightly. If the edges are not stuck together and fluid is escaping from the wound, do not attempt to open it any more. Wet dressings should now be applied. These should consist of from 4 to 12 layers of gauze, depending upon the size of the injury, which are wet in a freshly prepared boiled solution of boric acid.

TETANUS OR LOCKJAW.

Description.—Tetanus is a dangerous disease due to a particular kind of a germ which is introduced into the body by some sort of an injury, frequently a slight wound. The germ is often found in garden soil or street dust, coming principally from horse manure.

Symptoms.—The symptoms of tetanus are varied, but one of the most characteristic points is a stiffness of the neck and the lower jaw. Later on spasms of other parts of the body develop. The disease is extremely fatal, the mortality ranging somewhere between 50 and 85 per cent.

Treatment.—When a person has received a lacerated wound which has been much soiled by dust or dirt, or a punctured wound from a garden implement, the most important thing is to take the patient to a doctor and have him receive injections of antitetanus serum. This injection should be repeated at intervals of a week, until three doses have been given.

ABRASIONS.

Abrasions are very superficial wounds in which the outer layers of the skin have been rubbed or ground off by dragging the part forcibly over some rough surface.

Treatment.—If dirt has been ground into the injury it should be washed off with boric acid solution. If the surface is clean this is not necessary. A coat of diluted tincture of iodine, half strength or less may be applied, but ordinarily this is not necessary, and it is always very painful. Finally, dress with sterile gauze spread with boric acid ointment or oxide of zinc ointment.

SPLINTERS.

Small splinters may be removed from the flesh by means of a needle which has been passed once or twice through a flame and then cooled. Larger splinters may be extracted by passing a knife blade several times through a flame, cooling it, inserting the blade under the splinter and grasping the foreign body between the thumb nail and the knife.

WOUNDS CAUSED BY FISHHOOKS.

When the barbed end of a fishhook has entered the flesh, do not attempt to remove it by pulling it directly out. Such a procedure will cause great laceration and tearing of the tissues. The better plan is to depress the shank of the hook, push the point forward and onward in an upward direction, and bring it out on the surface at another point. The barbed end is then cut off with a wire cutter or file. The barbed end having been removed, the hook can be extracted by pulling on the shank without damage to the tissues.

BULLET WOUNDS.

Bullets make small, deep wounds which are generally classified as punctured wounds.

First-aid treatment.—Send for a doctor. If sterile gauze is available, cover the wound with that. Remember that there may be two wounds, one where the bullet went in, the other where it came out. If only one opening is seen, search for the other on the opposite side of the limb or body. Treat shock, if present.

SCALP WOUNDS.

Scalp wounds are common and often result from a blow on the head with a blunt object, such as a club or a beer bottle, the yielding scalp being caught between the rigid skull and the hard weapon.

First-aid treatment.—Check hemorrhage, if necessary, by laying a compress of sterile gauze on the wound and fastening it tightly with a bandage around the head. In severe cases a tourniquet may be tied around the forehead and head just above the ears. Send for a doctor. Treat shock if present.

WOUNDS OF THE ABDOMEN.

Shallow wounds of the abdomen are handled like similar injuries in other parts of the body, but deep wounds with escape of the bowels are very serious injuries and require special treatment.

First-aid treatment of wounds of the abdomen with escape of the bowels.—Send for a doctor at once. The bowels should be covered with several thicknesses of sterile gauze wet in boiled and cooled warm salt solution (a teaspoonful of salt to the quart of water). If no sterile gauze is at hand, boil a towel in a salt solution of the above strength, cool it until it is at body temperature, and then lay it over the intestines. Treat shock, which is certain to develop.

SNAKE BITES.

Description.—The bites of copperheads, water moccasins, coral snakes, and rattlesnakes are all poisonous. The diamond black rattlesnake is the most dangerous serpent of the United States. The bite from a small snake is not as poisonous as one inflicted by a large snake of the same species. The greater number of snake bites are received on the extremities.

Symptoms.—Intense pain, discolored swelling of the bitten part, which soon becomes very marked, and profound disturbance of the system. The general symptoms develop soon after the bite. They consist of great weakness and prostration, nausea, and a profuse flow of saliva. Paralysis of the muscles occurs in from three to four hours. Unconsciousness is rare, but the patient falls into a kind of stupor.

Treatment.—The bite is usually on the lower part of the limb, and a band made of a handkerchief, necktie, or similar article should be instantly applied a few inches above the wound between it and the heart and tightly twisted with a stick to shut off the circulation to the part and prevent the poison from being carried into the system by the circulating blood. The bite of most venomous serpents consists of but two punctures. These small wounds should be freely incised with a knife and then sucked. There is no danger in sucking the wound if there are no cracks or sores in the mouth or on the tongue. After the wound has been sucked it should be cauterized. This is done by applying carbolic acid or nitric acid on the end of a stick, such as a match stick or toothpick. Most of these injuries happen in the wilds, where such chemicals can not be obtained. Cauterization may then be performed by heating a nail, a knife blade, or some other metallic object, such as a suspender buckle, in a fire and freely burning all parts of the wound. On hunting trips a cartridge may be torn open and a little gunpowder poured on the wound and then ignited with a match.

After the wound has been sucked and cauterized so as to extract and destroy as much of the poison as possible, the tourniquet may be loosened. It should be allowed to remain loose for one minute and then tightened up again. Wait 20 minutes and if no alarming symptoms develop it is again released, and this time allowed to remain loose for two minutes, after which it is tightened. Another period of 20 minutes is allowed to elapse, and on this occasion the tourniquet is left off for three minutes. The procedure is continued for several hours, gradually increasing the time the tourniquet is off, and is known as using the intermittent tourniquet, the object being to allow only small quantities of the poison to get into the system at one time.

INSECT STINGS.

BEE STING.

The stings of bees and wasps and yellow jackets are very painful but not dangerous to life unless the victim is attacked by a large number of the insects.

Treatment.—If the sting remains in the flesh it should be pulled out and a drop or two of diluted ammonia water applied to the wound. A compress wet in cold water or cold boric-acid solution will help to allay pain.

STINGS OF CENTIPEDES, TARANTULAS, AND SCORPIONS.

The stings of these insects are very much more severe than those of wasps or bees and may cause considerable general weakness, headache, sweating, and vomiting, but they are practically never fatal.

Treatment.—The wound should be encouraged to bleed as much as possible and afterwards cauterized with carbolic acid or some other caustic, if available. Tincture of iodine may be applied. An ice compress should be placed over the wound to limit local reaction. General symptoms, such as prostration and headache, should be treated by moderate stimulation, giving aromatic spirits of ammonia, 30 drops in water every hour and supplementing this with half a cupful of very strong black coffee if necessary. Some authorities recommend the application of a constricting band, which is gradually loosened in order to prevent the poison from being taken up by the system rapidly.

DOG BITES.

Dog bites are usually minor lacerated wounds, but are especially dreaded on account of the danger of hydrophobia, which is almost invariably fatal.

Treatment of dog bites.—If a person is bitten by a healthy dog, the wound should be thoroughly swabbed with iodine, working the medicine well into all parts of the wounded flesh with a small swab of cotton on a clean toothpick and the wound treated in other respects as an ordinary lacerated wound. If the dog is sick, he should be confined and carefully watched. If he remains well for 14 days, there is little danger of hydrophobia developing in the patient. In no case should the dog be killed unless it is certain he is rabid, as in this way it will be impossible to tell whether or not he had rabies unless the head is sent to a laboratory for examination. If the dog has hydrophobia or is suspected of having hydrophobia at the time the injury is received, the wound should be thoroughly cauterized with pure nitric acid on a glass rod or the end of a match stick in the same manner as directed for the tincture of iodine. The acid

should be worked thoroughly into all parts of the wound, and the point of a glass medicine dropper makes an excellent instrument for this purpose. Care should be taken not to get the acid on the sound skin. Carbolic acid, followed by alcohol, may be used for the same purpose, but is not as efficient. This cauterization should, of course, be done by a physician if one is available. After the cauterization the patient should receive the Pasteur treatment, which consists of a series of injections covering a period of some weeks.

Symptoms of hydrophobia or rabies in a dog.—It is advisable that the public should know something about the symptoms of hydrophobia in animals. A dog which is developing the disease may show hardly any symptoms except weakness. Usually, however, the animal shows a marked change in disposition, refuses his food, is apprehensive and very restless. He is liable to run away from home, snap at anything in his way, and swallows sticks, stones, and other strange objects. Later on paralysis develops in the lower jaw. The jaw hangs down and saliva drools from the mouth. In the last stages the hind legs become paralyzed and the dog drags them. One should be especially careful about attempting to relieve a dog who apparently has some foreign object in the throat, the symptoms being that the jaw hangs down and saliva runs from the mouth. Such animals are very apt to be rabid, and if the hand is inserted into the mouth in an attempt to remove the supposed foreign body, the person may be bitten or injured accidentally by the teeth and infected with the disease. Hydrophobia usually does not develop within less than 10 days after the person is bitten, three weeks being about the average period. In rare instances the disease has appeared many months after the receipt of the injury. If the dog is suspected of being mad and has been killed after biting some one, the head should be cut off, packed in ice, and sent by express to the nearest laboratory for examination. Usually such laboratories are maintained by State health departments at the State capital.

BITES OF CATS AND OTHER SMALL ANIMALS.

These injuries are usually punctured and slightly lacerated wounds. The proper treatment is the application of tincture of iodine thoroughly worked into the wound, followed by a sterile dressing.

HEMORRHAGE OR BLEEDING.

ORDINARY BLEEDING.

In most wounds there is simply hemorrhage from the capillaries. The blood is red and flows steadily for a few moments, then the flow becomes slower, and finally loss of blood spontaneously ceases. Bleeding, from by far the greater majority of wounds, is of this

type. Such slight hemorrhage in reality is beneficial because it serves to wash bacteria out of the tissues if any have been deposited there. If bleeding from ordinary wounds does not cease spontaneously, it can practically always be checked by placing a pad of gauze over the wound and pressing it against the wound either by the hand or a bandage, in the meantime elevating the injury if it is in the arm or leg. Many wounds are on the extremities and this simple expedient of applying pressure and raising the part will be all that is required to control the bleeding in most cases.

Anything which makes the heart beat faster will increase hemorrhage, hence it is unwise to give stimulants to bleeding patients unless absolutely necessary to save life, and in all cases they should be kept in a recumbent or semirecumbent position and as quiet as possible.

Do not put styptics, such as Monsel's solution, turpentine, cobwebs, and similar substances in wounds to stop bleeding. Bleeding can be controlled by other methods, and the use of styptics is undesirable as a general rule.

BLEEDING FROM VEINS.

When a vein has been cut the blood wells up in the wound steadily and is dark red in color, sometimes almost black. If the vein is large, the blood flows rapidly, and a considerable amount may be lost. Such hemorrhage can be stopped by simply pressing a pad of sterile gauze over the wound and then elevating the part, having the patient lie down.

PACKING WOUNDS TO STOP BLEEDING.

1. In first-aid work if a doctor will arrive soon and severe bleeding of an extremity can not be stopped by elevation and the pressure of a pad on the wound, apply a tourniquet (p. ——).
2. If it is certain that medical aid can not be obtained in 4 hours, and the bleeding can not be checked by pressure and elevation of the part and becomes alarming, pack the wound.
3. Packing is also used to control hemorrhage from wounds of the trunk or neck which can not be controlled by pressure. Tourniquets, of course, can not be applied in these localities.

PREPARATION FOR PACKING A WOUND.

Everything which goes into the wound should be sterile, hence it may be necessary to apply a tourniquet (p. 17) to stop the bleeding while suitable preparations for packing are being made. The tourniquet should be loosened as soon as everything is ready. The bleeding may not recur, in which case packing will not be required. If bleeding of importance starts when the tourniquet is loosened, pack the wound.

Strips of sterile gauze or iodoform gauze make excellent packing material. If these are not at hand, strips of clean muslin may be boiled for 10 minutes, the water poured off, and the strips dried as well as possible by continuing to heat them in the pan with the lid off. Be sure there is enough material to fill the wound tightly. The muslin can be boiled at the same time as the instruments but in another pan.

EMERGENCY PACKING.

Even in camps or remote districts pans and a fire can generally be obtained and the bleeding controlled by a temporary tourniquet while the necessary articles are being boiled. However, if it is impossible to secure sterile materials, use the cleanest thing obtainable. Strips torn from a clean handkerchief, towel, napkin, or the sleeve of a shirt can be forced into a wound with a narrow stick, a buttonhook, a long wire nail, or a pencil. It is better to run the risk of infecting a wound than to allow a man to bleed to death. Such packing, however, should be removed as soon as sterile material can be obtained and the wound repacked if bleeding starts afresh.

BLEEDING FROM ARTERIES.

Blood from arteries comes in spurts or a fine jet and is bright red.

Treatment.—Very small bleeding arteries can often be controlled by pressure and slightly larger ones by packing, but as a general rule, if the artery is of any size and in an extremity, it will be best to apply a tourniquet immediately.

TOURNIQUETS.

Tourniquets are appliances used to check hemorrhage by compressing the arteries somewhere between the heart and the wound. It is well known that the flow of water through a soft tube, such as the tubing used on a fountain syringe, can be easily stopped by pinching the rubber between the fingers. Hemorrhage from a wound can be controlled in the same manner by pressing the main artery with the fingers or a pad against the bone which lies underneath or by making constriction around the limb by a very tight band.

In first-aid work it may be often necessary to improvise a tourniquet. For this purpose a handkerchief, necktie, towel, or any piece of material of sufficient strength, which can be knotted around the limb and twisted up with a stick, is frequently used. These are known as inelastic tourniquets, and when using them it is advisable, when time and circumstances permit, to place a pad over the main artery so as to make pressure on it directly.

FIG. 155.—Showing how much space should be left in tying a knot for a tourniquet.

FIG. 173.—The use of two pads to avoid bruising the flesh under the tourniquet and main artery of arm. Pair of shears used as lever to twist up tourniquet and held in position by handkerchief around the elbow.

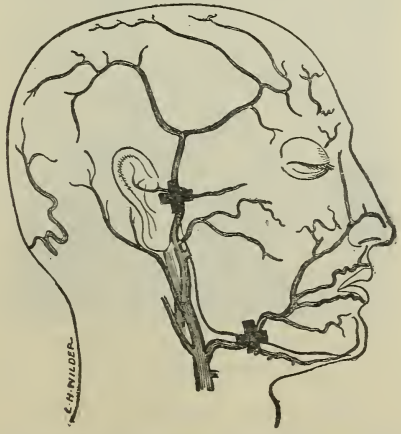


FIG 179.—Blood supply of the face. Crosses show points for applying pressure to check hemorrhage.

FIG. 180.—Point for applying pressure for checking hemorrhage from forehead.

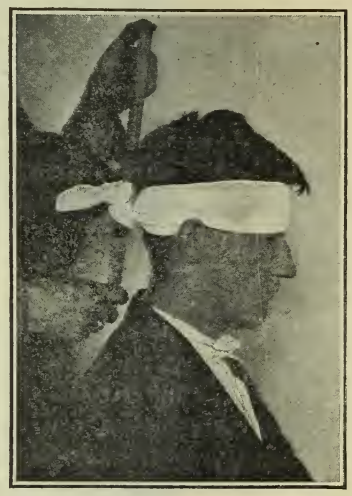


FIG. 181.—Method of applying tourniquet around forehead to check severe hemorrhage from the scalp.

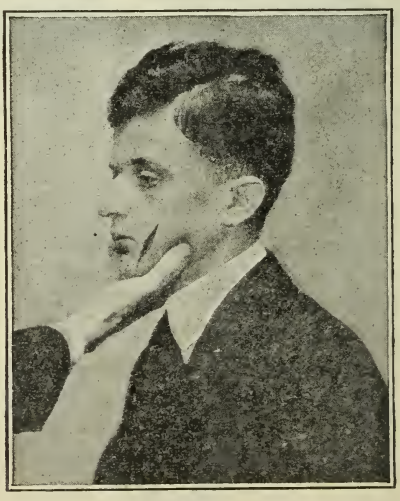


FIG. 182.—Point of applying pressure in hemorrhage from the lips or cheek.

BLEEDING FROM NECK.

There are many large blood vessels in the neck, and if one or more of these are severed furious bleeding results.

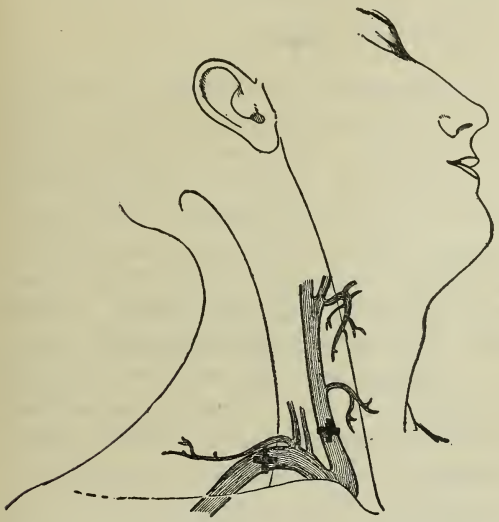


FIG. 183.—Main arteries of the neck. Crosses show points for applying pressure to check hemorrhage from neck, shoulder, or armpit.

FIG. 184.—Point of applying pressure to check hemorrhage from the neck.

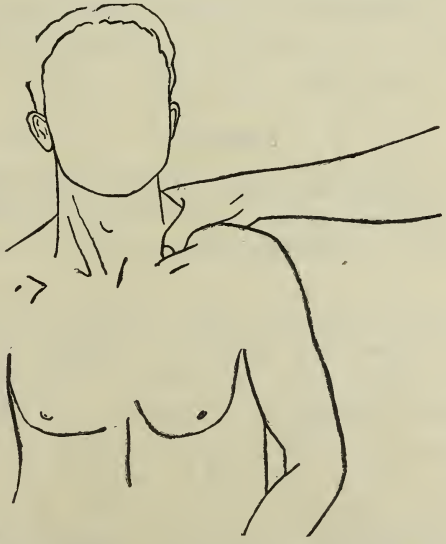


FIG. 185.—Point of applying pressure to check hemorrhage from the shoulder or armpit.

First-aid treatment.—It is impossible to apply a tourniquet to the neck, as it would cause immediate suffocation. Pressure inward and backward against the backbone should be made by the thumb, placed just above the breastbone. Make the pressures slightly from the side to avoid closing the windpipe (fig. 184). If the hemorrhage

is very severe, push the first available material at hand, such as a handkerchief or the end of a towel, into the wound, and hold it in place with backward pressure against the backbone. Send for a doctor at once. Have the patient sit up in a chair.

BLEEDING FROM THE NOSE.

If it becomes necessary to check nosebleed the patient should be placed in a semirecumbent position, that is, lying on a bed or couch with shoulders and head slightly elevated. This can be easily done by placing a tipped-over chair behind the patient. A flexible roll about 2 inches long and one-third of an inch in diameter should then be made out of newspaper or muslin and forced under the upper lip. This pad goes well up between the gum and the lip and does not rest on the teeth. It should be firmly pushed in place and should put the lip under considerable tension. The patient should remain absolutely quiet and should on no account blow the nose, as this will detach the clot and the hemorrhage will start afresh. Ice applied to the back of the neck will sometimes prove effective. If these remedies fail and the bleeding continues for a long time, as a last resort it may be necessary to pack the nostril. This is done by introducing into the nose a long strip of gauze or muslin about an inch and a half wide by means of a blunt end of a penholder or a similar blunt-pointed instrument. The gauze should be packed in firmly, filling the back part of the nostril first and gradually working forward. One end of the strip should be left out of the nose in order to facilitate its removal.

SHOCK.

After a severe accident the patient almost always goes into a peculiar mental and physical condition, which is called *shock*. This condition may immediately follow the injury or may not develop for some time.

Symptoms of shock.—The face is pale with a dull expression. The skin is cold and covered with a clammy perspiration. The pulse is weak and rapid. It may be impossible to feel the pulse at the wrist. The patient is usually conscious but is in a peculiar state of mental indifference, lying with the eyes partially closed and making no effort to move. He may respond to questions, but no dependence can be placed on the truth of his statements. He rarely feels pain and seems to be indifferent to his fate. The breathing is rapid, irregular, and shallow, sometimes gasping. Under suitable treatment recovery from the condition may be expected, but in severe cases shock may continue and death follow.

Treatment.—The symptoms of shock give a fairly clear idea as to what the treatment should be. The body is cold, hence it should be

warmly covered, the patient lying in a recumbent position with the head low. External heat should be immediately applied by means of bottles, jugs, or other containers filled with hot water. These should be placed alongside of and between the legs and around the feet. In emregencies hot bricks or even hot stones can be used. Great care should be taken that the patient is not burnt by these appliances, however, and they should be well wrapped. The heart is weak, hence stimulants should be given. The best of these for shock is probably a small quantity of very strong hot black coffee. Aromatic spirits of ammonia, one-half a teaspoonful in a half tumblerful of water, is also another excellent remedy. Very small quantities of warm soup or milk are sometimes useful. Atropine sulphate in doses of 1/100 of a grain is highly recommended. Do not repeat oftener than every three hours. Liquor in shock is of questionable value. *If no other stimulants are available*, however, a moderate-sized drink of whisky may be given in warm water.

Unconscious patients can not be given stimulants by the mouth, in which case smelling salts can be held under the nose, or a few drops of ammonia water sprinkled on a handkerchief and the patient allowed to inhale the fumes at intervals a minute apart.

In case a patient who has shock is found to be bleeding freely, the first indication is to stop the hemorrhage, and this must be done regardless of his condition, as there is no hope of recovery as long as the loss of blood continues.

BANDAGES AND BANDAGING.

Bandages are generally made of muslin or gauze. There are three principal varieties of bandages in common use—the roller bandage, triangular bandage, and the many-tailed bandage.

ROLLER BANDAGE.

These bandages are composed of long, narrow strips of muslin or gauze. The gauze roller bandage is the better because it has considerable elasticity and is easier to fit to the part. The use of roller bandages requires some training and considerable practice. It is not difficult, however, to apply a roller bandage to the finger, wrist, or the knee joint.

METHOD OF APPLYING ROLLER BANDAGES.

Having selected the proper size, hold the bandage in the right hand. Place the free end of the bandage on the part and prevent it from slipping with the forefinger or thumb of the left hand. The bandage is wrapped around the limb, passing from the operator's left to right, as it goes across the front. On bandaging the trunk or upper parts of the extremities, it is necessary to pass the bandage from the right to the left hand in going behind.

If the part to be covered is of the same diameter all the way up, the bandage is simply wound around the limb or body, each turn

FIG. 189.—Circular bandage. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

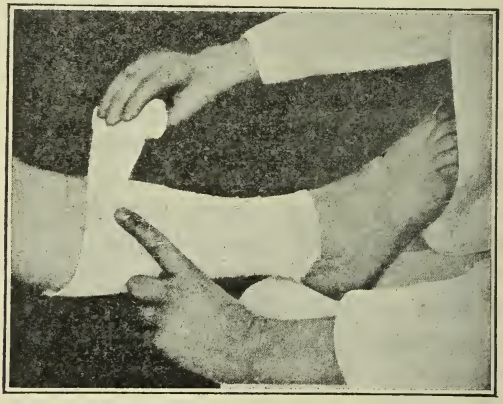


FIG. 190.—Method of making the spiral reverse bandage. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

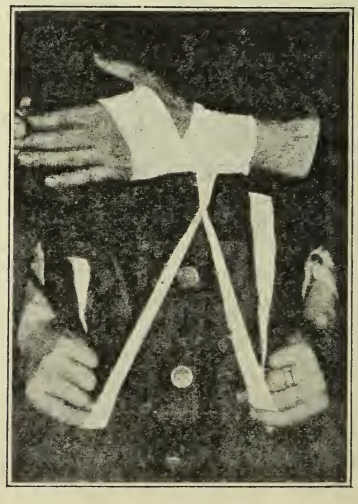


FIG. 191.—Fastening a bandage by splitting the ends.

overlapping the preceding one by about two-thirds of its width. If the part increases in diameter as the bandage ascends, as, for instance, the calf of the leg, it is necessary to make a half turn or fold

with the bandage at each revolution where the limb becomes larger. To do this, the thumb or forefinger of the left hand is placed on the bandage in the front of the limb and the bandage given a half turn on itself, making it point in a downward direction instead of upward. The reverse is repeated at every turn until the greatest diameter of the limb is passed, when ordinary circular turns may again be resumed.

Roller bandages should be applied firmly, but neither too tightly nor too loosely. If they are too tight, they will shut off the circulation and cause considerable pain. If they are too loose, they very quickly come off or will permit the dressing to be displaced from the

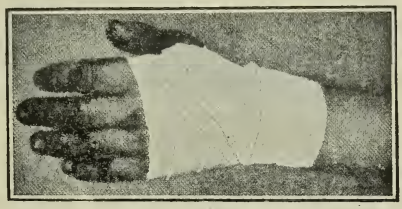


FIG. 194.—Figure of eight of the wrist and hand. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

wound. In using a roller bandage the ends of the fingers or toes should always be left out of the bandage, so that the operator can see if the circulation has been stopped.

THE TRIANGULAR BANDAGE.

The triangular bandage has been much advocated for emergency use and for those who are inexperienced with the roller bandage. This bandage, also called the Esmarch's bandage, comes in the shape of a triangle, being about 36 inches long on the short sides and about 51 inches on the diagonal. Such a bandage makes an excellent sling and also a good tourniquet. It can be used to completely envelop a hand or foot in the case of a crushing injury. Folded up on itself so as to make a strip about 4 inches wide, it is known as the "cravat" bandage, and is useful for holding dressings in place about the head.

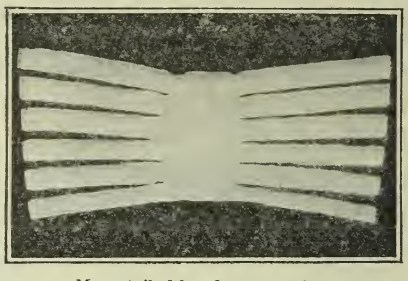
The triangle bandage is frequently found in first-aid packets and is sometimes covered with pictures illustrating its use. However, such bandages are generally stiff and difficult to apply snugly.

THE MANY-TAILED BANDAGE.

This is probably the most useful all-around bandage for first-aid work, because it can be applied by anyone who has once seen it used and can be improvised out of materials which are generally at hand. The many-tailed bandage is simply a series of strips of muslin which are tied around the limb, but instead of being entirely separated are

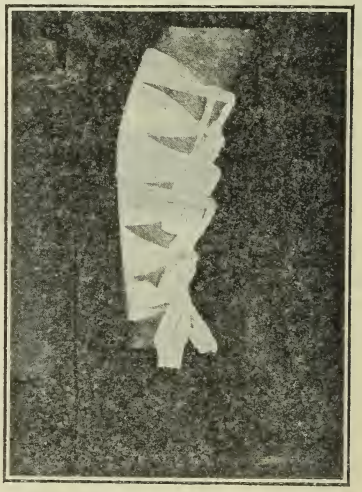
left attached to each other at their middle. This attachment serves to hold them in place and to keep the bandage in position.

To make a many-tailed bandage, take a strip of cloth long enough to go completely around the limb and dressing and provide ends which can be tied. The ends are folded together and notched with



Many-tailed bandage, complete.

scissors or a knife at intervals of about an inch and a half. The cloth is torn at these points almost to the fold but not quite. The bandage is applied by laying it under the limb, straightening out the tails, and tying each tail with its fellow over the dressing in front of the limb. For neatness the loose ends, after they are tied,



Many-tailed bandage, applied.

may be placed under the next one as they are fastened, thus giving the dressing a better appearance. Such a bandage can be easily loosened or tightened as occasion demands, and it can be removed and the dressing changed and the bandage used over again. It can be applied to any part of the body and holds its position well. It should be made out of muslin, old sheeting being excellent for this purpose.

IMPROVISED BANDAGES.

There are certain parts of the body, such as the arm pit, back, and groin, on which it is difficult to retain a dressing. Frequently dressings or compresses can be held in these locations very satisfactorily by pinning them fast to the shirt and then taking up the slack in the underwear by pins on the other side of the body.

A dressing can be quite satisfactorily held in place on the foot or leg by a stocking. The stocking should be rolled up and unrolled over the dressing as it ascends the leg. Pieces of stocking legs make an excellent temporary means of holding dressings on the arm also in emergencies.

PLASTER.

Court-plaster or adhesive plaster should never be applied directly over a wound. Such plasters generally contain germs, and they seal the wound up, preventing the escape of fluid, and causing conditions which greatly favor the multiplication and growth of bacteria. It is permissible to hold a small dressing of gauze in position over a wound by means of a strip of adhesive plaster, as, for instance, on wounds somewhere about the face, but the plaster should never touch the wound directly and there should be enough gauze under it to take up any discharges which may seep out of the injury.

In a great emergency where a physician is not available to treat a large, gaping wound it may be necessary to pull the edges of the wound together with strips of adhesive plaster. If this is done the plaster should be in narrow strips and wide intervals left between for the escape of secretions from the wound.

Before applying strips of plaster in this fashion the skin should be shaved if it is very hairy. Adhesive plaster may be removed without pain by wetting it in gasoline or ether.

MISCELLANEOUS MINOR INJURIES.

BRUISE.

Description.—A bruise is the injury produced by a blow with some blunt object. Bruises are received in two ways—the body may be still and the object moving, as when a boy is struck by a thrown baseball, or the body may be moving and strike against some fixed object, as when a man falls and injures himself on a hard pavement. Bruises are the commonest of all accidents, and everyone has at some time suffered from them.

Treatment.—If the injury is slight, no treatment is required. If more severe, cold-water compress should be applied. To make a cold-water compress take from 6 to 10 folds of old muslin, linen, or such material (a couple of thicknesses of turkish toweling makes an

excellent compress). The dressing should be large enough to cover the injured surface and extend a couple of inches beyond, and should be thick enough to retain the moisture for some time. It is wrung out in cold water and then laid on the seat of the injury. Some covering will be required to prevent the dressing from becoming dry, and also to protect the clothing or bed. The most available material for this purpose is oiled paper. In an emergency an old piece of oilcloth or any flexible waterproof material will do very well. This is put outside of the compress and the whole held in place by a bandage of some sort. The compress may be continued for three or four days, after which rubbing the injured part twice a day with a mixture of equal parts of alcohol and water or undiluted whisky will help to take out the soreness.

BLACK EYE.

A black eye is merely one form of a bruise. As soon as a blow is received in this region a handkerchief wrung out in ice water should be applied. The ice water should be renewed as often as it gets warm, thus combining the effect of both cold and moisture. This treatment should be kept up from half an hour to an hour and may prevent discoloration from setting in.

If treatment is begun after the flesh has become black, hot-water applications for half an hour, three times a day, will hasten the disappearance of the swelling and discoloration. The old-fashioned practice of applying raw beefsteak is not recommended. In all cases where a severe blow has been received in the region of the eye a physician should be consulted, as there is danger that injury may have been done to the eyeball.

STRAINS.

Description.—Strains are the injuries produced by overstretching a muscle. The muscle, in severe cases, may be partially torn or even ruptured. The muscles of the back, shoulder, and wrists are often the seat of strains. A sudden wrench or too great exertion frequently causes a strain.

Symptoms.—Pain which is increased when the part is moved, soreness, and more or less swelling.

Treatment.—Rest, with gentle rubbing with alcohol and water, equal parts; tincture of arnica or soap liniment. Later on the rubbing should be more vigorous, with gentle kneading of the muscles affected. The application of dry heat by means of hot-water bags or bags filled with hot sand will often give relief from pain and help to "limber up" the part.

FOREIGN BODIES IN THE EYE.

Foreign bodies in the eye come under two classes, first those which lodge under the lids and second those which are firmly adherent to the clear part of the eyeball, the cornea, sometimes known as the sight of the eye.

Treatment.—To remove a foreign body from under the lid, first of all determine which lid is affected. To do this, seat the patient on a chair facing a window and pull the lower eyelid down, having the patient look up. If a cinder or other speck is seen, take a clean pocket handkerchief, folded so that it makes a point, and remove the object

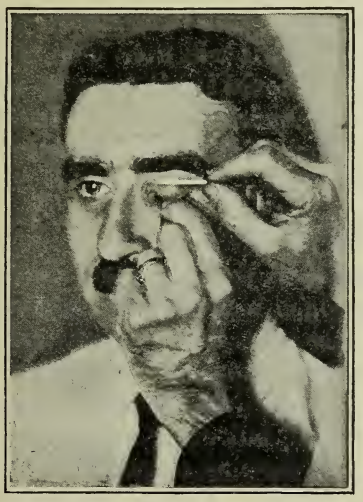


FIG. 242.—Eversion of the upper lid, step one.

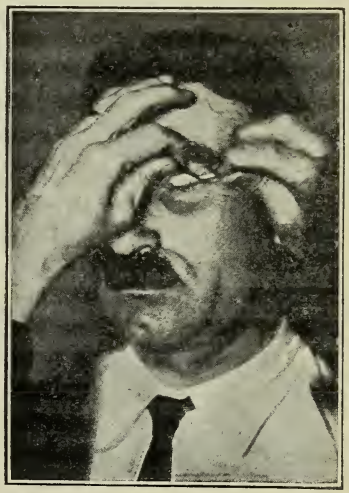


FIG. 243.—Eversion of the upper lid, step two.

with the point. Wetting the tip of the handkerchief with clean water will sometimes assist the process of removal.

If nothing is seen on the lower lid, it will be necessary to evert the upper lid. To do this take a match, lay it across the lid, holding it in one hand, grasp the eyelashes with the fingers of the other hand, *have the patient look down,* and turn the lid upside down by pulling the lashes up over the match. The lid may be held in this position by the left hand and the foreign body removed with the handkerchief as described above. If it is very firmly embedded, a clean toothpick may be used to loosen it from the flesh.

FOREIGN BODIES IN THE NOSE.

Children occasionally slip beans and other similar objects into the nose. The bean may swell, making an effort to dislodge it particularly difficult. Sometimes these bodies may be removed by closing the other side of the nose and having the child blow the nose vigorously. Another device worthy of trial is to cause the child

to sneeze by tickling the nose with a feather. Occasionally, if the object is readily seen, an attempt to remove it may be made by bending a hairpin slightly and attempting to insert the curved end alongside the object, holding the points in the fingers. These cases generally require the services of a physician, and they should always be taken to a doctor in case the simple treatment above described is not successful.

FOREIGN BODIES IN THE EAR.

Various foreign bodies are occasionally introduced into the ears and may be the source of a great deal of discomfort and pain. An insect in the ear may be removed by turning the head to one side and filling the ear with warm sweet oil poured into it by means of a spoon. The oil will suffocate the insect and it will float out. For the removal of other objects a physician should in all cases be employed, as a great deal of harm can be done by inserting sharp instruments into this cavity. Occasionally a small object may be removed by a gentle syringing with warm water.

FOREIGN BODIES IN THE THROAT.

The beginning of the throat is known as the pharynx. Lower down there are two passages, one of which leads to the stomach, called the gullet or esophagus. The other leads to the lungs, and is known as the larynx at the upper end, lower down the windpipe or trachea. Foreign bodies may lodge in any of these passageways. Commonly such objects are articles of food, but other things which have been held in the mouth—like coins, safety pins, or marbles—may accidentally slip back and lodge in the throat. Young children are especially apt to put any small articles which they get into their hands into their mouths, and occasionally they attempt to swallow them, with disastrous results.

Foreign bodies in the pharynx.—Large foreign bodies in the pharynx cause great interference with breathing. They can generally be removed by opening the mouth and pulling the object forward by means of the fingers or by hooking the index finger behind it.

Treatment.—Place the patient on a chair facing the light, open the mouth, and hold the tongue down with the handle of a teaspoon. It may be possible in this way to see the object and to extract it. Inversion can be tried in the case of a child and the same effect produced in an adult by having him lie crosswise on a bed on his abdomen with his head and shoulders hanging over the side. Failing to remove the obstruction in this way, send for a doctor at once.

Foreign bodies in the gullet—Symptoms.—When an object lodges in the gullet the patient has pain, difficulty in swallowing, and breathing may be interfered with. Occasionally the symptoms may be slight, but more often the object produces inflammation.

Treatment.—The treatment is the same as advised for foreign bodies in the pharynx.

NOTE.—If a child or adult has swallowed some sharp or pointed article like a piece of broken glass or a pin, give him a diet composed largely of mashed potatoes and bread. Encourage him to eat as much as possible of these articles for several days. They will surround the foreign body in large masses and prevent it from injuring the walls of the intestine. Do not give purgatives at once, but after the bread-and-potato diet has been taken for two or three days a mild laxative may be given. Watch the passages carefully for several days to be certain that the object has been passed. Such cases should always be under the care of a doctor when he is available.

Foreign bodies in the larynx—Symptoms.—When a foreign body enters the upper part of the windpipe it immediately sets up a violent attack of coughing which frequently results in its expulsion. A small article may, however, remain in the windpipe and gradually work its way lower to some point in the lung where it remains permanently, causing a continual inflammation characterized by cough, with foul and blood-streaked expectoration. If the object is large it may completely close the passage and prevent the entrance of air to the lungs and threaten death by suffocation. In such cases a patient becomes black in the face and makes frantic struggles to secure air.

Treatment.—If the patient is a child, he should be picked up by the feet and held suspended with the head downward, which may cause the object to fall out by its own weight. Failing in this, if the symptoms are not alarming, endeavor to quiet the sufferer and send for a doctor at once.

SPRAINS.

Sprains are the inujries produced by wrenching or twisting a joint. Sprains of the ankle, wrist, shoulder, and knee are very common. Severe sprains should always be treated by a doctor, if possible. There was an old saying that bad sprains were worse than fractures. As a matter of fact, many of these "sprains" were in reality small or partial fractures near the joint, especially when involving the ankle. In severe sprains of the shoulder, wrist, or ankle an X-ray examination of the affected part should always be made if it is possible to do so. Sprains of the ankle in which extensive areas of black and blue skin are observed, extending for a considerable distance up the leg, are almost always accompanied by fractures.

Symptoms.—Severe pain, always increased by motion of the joint, and hence there is often apparent lack of ability to move the limb. Swelling and sometimes redness, later on possibly discoloration.

Treatment.—Absolute rest to the joint. If at the wrist or shoulder, put the arm in a sling. If a knee or ankle is involved, put the patient

in bed and rest the joint on a pillow. Apply cold water compresses, using a thick dressing large enough to wrap completely around the joint and extend well above and below it. Hot-water compresses may be used if more agreeable to the patient. Continue the compresses until the pain and swelling subside. This may require from two to five days. Then cautiously begin rubbing with alcohol diluted with an equal amount of water or tincture of arnica. Later, in addition to the rubbing, which should become gradually more vigorous, begin gently moving the joints by grasping the hand or foot and moving it in various directions. These motions should be made by the operator and not by the patient. The injured person should exercise great caution in beginning to use the part.

DISLOCATIONS.

Description.—When one of the bones is forced out of its proper place in a joint and remains permanently out, the injury is known as a dislocation. These accidents tear or stretch the ligaments, and even if properly treated the joint is apt to be weak afterwards and will slip out of place more easily a second time. The shoulder joint is more frequently dislocated than any other joint in the body.

Causes.—Dislocations are usually the result of falls or severe accidents.

Symptoms.—Pain, inability to move the joint in the usual manner, the appearance of the joint differs from the sound one on the other side, the end of the displaced bone may be felt to be in an improper position when compared with its uninjured fellow, and swelling may occur shortly after the injury has been received.

First-aid treatment.—Always send for a physician if one is available. Pending his arrival apply cold water compresses to the joint and put the part at rest by placing the arm in a sling if it is in the upper extremity or by having the patient lie down and rest the injured member on a pillow if the accident has happened to the lower extremity. This is all that need be done until the arrival of the surgeon under ordinary circumstances. It is difficult to reduce most dislocations, and considerable harm may be done by inexperienced persons in their attempts to do so.

FRACTURES.

When the bone is broken and there is no wound, the injury is known as a *simple fracture*. If the skin is broken and there is a wound leading down to the ends of the bone, it is called a *compound fracture*. The student should remember that a compound fracture, then, is one in which the fracture is compounded by a wound. A *compound* fracture is *not* a fracture in which the bone is broken in more than one piece without a wound. Such fractures are called

comminuted fractures. Briefly, then, a *simple* fracture is one without a wound, a *compound* fracture is one with a wound. The distinction between these two varieties of injury is very important, because, while most simple fractures unite without difficulty or grave symptoms, compound fractures, on the other hand, on account of the open wound frequently become infected with pus germs. Active suppuration follows, which involves the bone, and a long time is required for recovery. Hence, compound fractures are very serious injuries and may even at times prove fatal. Every effort should therefore be made to prevent a simple fracture from becoming compound. As above explained, if the patient is carelessly moved, a sharp bit of bone may be easily forced through the flesh and skin and the simple fracture be converted into a compound fracture by injudicious handling. To prevent this accident splints or some sort of appliance should always be placed around broken bones before the sufferer is moved.

In case a man has received an injury and fracture is suspected, there being great pain, more or less loss of motion, possibly numbness in the fingers or toes, it is always wiser in first-aid work to assume that there is a fracture present and treat the case accordingly until medical help is available. Splints can be improvised almost anywhere and it will do no harm to put the injured member on a splint and take the patient to a physician, even if there is actually no fracture, whereas if there is a fracture and this precaution is omitted great damage may result, because an unprotected simple fracture may be converted into a compound one during the journey.

First-aid treatment of simple fracture.—Before taking up the treatment of fractures it is necessary to describe emergency splints.

When a fracture is suspected, lay the limb on a folded blanket, coat, pillow, or other flat, soft object while splints are being prepared.

Splints are used to prevent motion of the ends of the broken bone while the patient is being transported, and later on to hold the fragments in proper position and prevent motion while they are healing. Union can not take place if there is motion at the seat of a fracture.

Emergency splints can always be devised from some material at hand. Light boards from broken boxes make excellent splints. Two or more pieces may be nailed together in order to get one strip of sufficient length. Heavy corrugated pasteboard is frequently used, also sections of tin gutters and properly shaped strips of tin. Other articles which suggest themselves are fence pickets, laths, umbrellas, canes, rifles, and even bundles of twigs. The material selected should be sufficiently rigid to support the weight of the limb and hold it immovable.

The splints must be padded on the side which goes next to the flesh, as otherwise they are extremely painful and may seriously damage the skin. Cotton is the best material for padding, but other substances, such as waste, pieces of old cloths or quilts, excelsior, straw, grass, moss, etc., may be used. Special attention should be given to padding the end of the splint which will come against the body. Splints should be wide enough to give firm support; in the case of a forearm or leg, as wide as the part itself. Emergency splints can be applied over the clothing, which will help to cushion them and protect the part.

Applying splints.—In applying splints great care must be exercised in moving or handling the injured part. Both fragments of the broken bone must be supported when it is lifted or its position changed. When one splint is in place endeavor to overcome obvious deformity and get the part into a natural position by a very gentle manipulation. Then adjust the other splint and fasten them to the limb.

Swelling very promptly follows most fractures and the limb is very painful and tender to touch. If the swelling is marked it is customary to remove the emergency splint as soon as the patient arrives home or at the hospital and to place the limb on a pillow and apply cold-water compresses or compresses of leadwater and opium for three days. Lead and opium wash is prepared by taking one-half of an ounce of tincture of opium and one-half of an ounce of liquor plumbi subacetatis. These two are mixed together and then this mixture is added to a pint of water, making the well-known leadwater and opium. This solution is much used in the treatment of bruises, sprained joints, and recent fractures where the skin is not broken. Gauze, towels, or similar material are rung out in the fluid and applied in the same manner as wet dressings. The remedy is poisonous, however, and should be kept out of the reach of children and never taken internally. After the swelling has somewhat subsided the permanent splints are applied. It is advisable to reduce the fracture and apply the permanent splints as soon as possible, because the longer this is postponed the more difficult it will become to get the bones into proper position.

FRACTURES OF THE FINGERS.

Symptoms.—It is generally possible to obtain crepitus by gently rotating the ends of the fingers.

First-aid treatment.—All that is necessary is to place the hand in a sling pending medical attention.

After treatment.—Make a light wooden splint of cigar-box wood or similar material the width of the finger and long enough to extend from the end of the finger well into the palm. Pad and apply (fig.

261). Keep the splint on for three weeks, and keep the hand during this period in a sling to avoid bumps and jars.

FRACTURE OF THE BONES OF THE HAND.

Symptoms.—Usually crepitus can be detected by carefully manipulating the suspected bone.

First-aid treatment.—Place the hand in a sling. The other bones will act as a splint.

After treatment.—Lay the hand on a splint which extends from the ends of the fingers half way up the wrist. Pad it well and place a large ball of padding where the palm will rest. Lay the hand and forearm on the splint and put it in as good a position as possible. Fasten the hand to the splints with a roller bandage or a many-tailed bandage. Then place the hand in a broad sling. Keep the splint in position for three weeks, beginning passive motion of the fingers at the end of the second week.

FRACTURE OF THE WRIST.

This is very often produced by a fall on a slippery pavement, the patient striking the ground with the palm of the hand in his effort to save himself.

Symptoms.—Marked deformity and numbness of the fingers.

First-aid treatment.—No splint will be required in most cases, it being sufficient to place the arm and hand in a broad sling until a physician can be secured.

FRACTURES OF FOREARM.

The arm extends from the shoulder to the elbow; the forearm from the elbow to the wrist. There are two bones in the forearm. Either one of these bones may be broken or both. When only one bone is broken the other acts as a splint and the symptoms of fracture may not be clear. In cranking an automobile, if the motor backfires the crank will be violently whirled around in the reverse direction and frequently causes fracture of the forearm of the operator.

FRACTURE OF BOTH BONES OF THE FOREARM.

Symptoms.—Pain, inability to turn palm upward and downward, possibly grating, false motion.

First-aid treatment.—Bend the forearm to a right angle with the arm. Apply two padded emergency splints extending from the elbow to the knuckle. Lay the forearm and the hand on the lower splint, gently straighten the part as well as possible, and place the other splint on the back of the hand and arm. Fasten in place the bandage or strips of muslin and support the arm and hand in a broad sling.

FRACTURE OF THE ARM.

Fractures of the arm are common, but it is sometimes difficult to get union.

Symptoms.—Pain, shortening, inability to move the arm, and sometimes crepitus and false motion may be detected. The appearance of black and blue spots on the arm after an injury in places which have not been bruised themselves should suggest the likelihood of a fracture.

First-aid treatment.—Place a broad wedge-shaped pad between the chest and the arm long enough to extend from the arm pit nearly to the elbow. The edge of the wedge goes into the armpit (fig. 269). This pad may be constructed of towels or even folded newspapers wrapped in some soft material. It is held in place by a band or strips going over the opposite shoulder. The pad gives a firm, straight surface to support the arm on the inside. Apply three short, narrow padded splints to arm running from the shoulder to the elbow, one on the outside, one behind, and one in front. Hold the splints in place with a many-tailed bandage or three strips of muslin. Fasten the arm to the chest with a bandage going around the rest of the body or with strips of adhesive plaster or a towel pinned in place. Place the forearm in a sling and use a narrow sling supporting the wrist only.

FRACTURE OF THE SKULL.

Fracture of the skull may occur at the top or vault of the skull, or the lower part, when they are known as fractures of the base of the skull.

Fractures of the skull are serious injuries and may be due to blows, falls, or other accidents.

Fracture of the upper part of the skull can often be felt by running the finger over the scalp, the depression in the bone being easily detected. The gravity of fractures in this location depends largely on the damage done to the brain and blood vessels. If large arteries have been ruptured inside the skull the blood pours out and compresses the brain, giving rise to symptoms of brain compression.

FRACTURES OF THE BASE OF THE SKULL.

Fractures of the base of the skull are generally compound, the wound not being visible, but in the nose, pharynx, or ears. They are of course very dangerous injuries.

Symptoms.—There may be partial or complete loss of consciousness, bleeding, or the escape of blood-stained fluid from the nose or ears and paralysis of the face. Later the symptoms of compression may be developed such as paralysis, slow stertorous breathing, unequal pupils, etc.

First-aid treatment.—Send for a doctor at once. Raise the head on a pillow or folded coat. Treat shock by applying hot-water bottles, jugs filled with hot water, or hot bricks around the feet and body. Be careful not to burn an unconscious patient. *Do not give whisky or other stimulants.*

FRACTURE OF THE COLLAR BONE.

Fracture of the collar bone is frequently due to a fall in which the person strikes with the weight on the hand.

Symptoms.—The patient generally supports the injured arm with the other hand. It is easy to detect a fracture of the collar bone, because the bone is placed directly under the skin and the deformity may be seen or felt. Always compare with the other side. Stand behind the patient with his clothing removed and grasp the collar bone on each side between the fingers. Make gentle motion. It will be found that the bone on the injured side can be moved and on the other side it is rigid.

First-aid treatment.—Make a pad of towels, newspaper, or other flexible material and place in between the arm and the side in the armpit. Keep the pad in position by straps going over the opposite shoulder. Bind the arm to the side by bandages, a towel, or strips of muslin, and then make a sling which specially supports the point of the elbow so as to raise the elbow up.

FRACTURE OF THE RIBS.

These injuries are often due to kicks in the side from heavy boots with the person lying on the ground. They may, however, be due to direct violence of all kinds.

Symptoms.—Pain which is likely to be sharp and stabbing, when the patient takes a deep breath or when he coughs. It may be possible to detect unnatural motion in a broken rib by carefully running along its course from the backbone to the breastbone and making pressure.

First-aid treatment.—Wrap a strip of muslin or a towel around the chest tightly and pin it. Support with straps running over the shoulders.

BROKEN NECK OR BACK.

Contrary to common belief, it is possible for a person with a broken neck or back to recover and live for many years. These injuries, however, generally severely damage the spinal cord, which is inclosed in the backbone, and more or less permanent paralysis results.

Symptoms.—Inability to move the legs. Loss of feeling in the members which are affected. If a severely injured person who is conscious can not move his legs, always suspect fracture of the back.

First-aid treatment.—The first-aid treatment of a broken back is very important, for if the injury is high up and the patient is roughly moved, the sharp edges of the broken bones may crush or compress the spinal cord to such an extent that instant death results. Therefore, if circumstances permit, do not move the patient at all pending the arrival of a doctor. If it is impossible to secure a physician, the patient should be lifted or moved only on a blanket or sheet supported at the four corners and the sides.

FRACTURES OF THE LOWER EXTREMITIES.

The thigh extends from the knee to the hip and the leg from the knee to the ankle.

Symptoms.—If the ends of the bone are driven together, as they sometimes are, especially near the hip joint, the symptoms may be very slight, and it will be difficult for the inexperienced to tell whether there is a fracture or not. All fractures in the middle part of the bone will give the following symptoms:

Pain, inability to stand on the injured leg, shortening, and it will be noted that the toe on the affected side falls out. When it is placed in its natural position it again drops in a helpless manner.

First-aid treatment.—Call a doctor. Apply a long splint on the outside of the affected leg extending from the heel to the armpit. Pad it on the side toward the body. Apply another splint on the inside of the leg, extending from the crotch to the heel. Fasten these splints by at least three strips of muslin or similar material around the body and five around the leg and thigh. These strips should be placed under the patient before the splints are applied. In lifting the thigh for this purpose have one assistant carefully support both ends of the broken bone and another the foot when the broken extremity is lifted from the ground. The leg should be carefully lifted by one person when the patient is being placed on a stretcher. Treat shock if it is present.

FRACTURE OF THE KNEE CAP.

Symptoms.—The patient can not stand and is unable to raise the limb from the ground. Very often separation of the two pieces of bone may be felt by the fingers if the case is examined before swelling has set in.

Treatment.—Make a splint about 3 feet long and 4 inches wide. Pad it well and place it under the thigh and leg. Fasten it in place with a number of handkerchiefs, strips of muslin or a bandage.

FRACTURES OF THE BONES OF THE LEG.

The leg extends from the knee to the ankle joint and contains two bones. The larger bone of the leg is called the tibia. The other bone is long and slender and placed to the outer side, called the fibula.

Either or both of the bones of the leg may be broken. If only one bone is fractured the other acts as a splint and it may be difficult to make a correct diagnosis of the injury.

FRACTURE OF BOTH BONES OF THE LEG.

Symptoms.—The patient is unable to stand. There is generally deformity and false motion. Crepitus may be detected.

First-aid treatment.—Apply two well-padded splints to the sides of the legs extending from well above the knee to below the heel. Fasten in place with five strips of bandage or muslin. If a pillow is available, lay the leg on the pillow. Bring the sides of the pillow up around the leg and tie them in place with strips of muslin or bandage. A folded blanket may be used in place of a pillow. Two side splints may be now placed, without padding, on the outside of the pillow or blanket. If no other appliances are available, the injured leg may be fastened to the other leg with strips of bandages or hand kerchiefs, the sound limb acting as a splint.

POTT'S FRACTURE.

A fracture of the outer bone of the leg—that is, the fibula—a few inches above the ankle is known as a Pott's fracture. It is a very common injury.

Symptoms.—The foot points outward and there is unnatural motion at the ankle joint.

First-aid treatment.—The same as described above for fracture of both bones of the leg.

FRACTURES OF THE BONES OF THE FOOT.

These are usually due to direct force and are often compound.

Symptoms.—There is a great pain in the foot on attempts to walk, and crepitus may be produced on gently manipulating the injured bone.

First-aid treatment.—The other bones act as splints and usually nothing will be required except to lay the foot on a pillow.

FRACTURES OF THE TOES.

First-aid treatment.—A light splint may be applied to the sole of the foot, but usually no splint will be necessary.

COMPOUND FRACTURES.

Compound fractures have already been described as fractures which are complicated by wound extending down to the broken bones. It is possible to break a bone and receive a wound of the skin or a wound in some other part of the limb, but if the wound does not communicate with the fracture it is not a compound fracture.

Symptoms.—The symptoms are the same as those of any other fracture, with the addition of the wound. In severe cases the end of the broken bone may come through the wound and project on the outside.

First-aid treatment.—The great aim of the treatment of compound fractures is to prevent bacteria getting into the wound. If pus germs gain admission there will be a great deal of swelling and inflammation and finally suppuration. The healing of the fracture will be prolonged for many weeks, and sometimes there is so much destruction of the bone by inflammatory processes that healing does not take place at all until surgical measures are employed. Therefore, in a compound fracture, always cover the wound with a sterile dressing at the earliest possible moment. After the wound has been covered, splints may be applied as in the manner already described. In case a sterile dressing is not available, the wound should be allowed to remain exposed to the air while one is being prepared. A suitable dressing made of muslin or toweling may be folded into shape and boiled. After this dressing has been placed on the wound and fastened in place then apply the splints.

If one of these bones is sticking out through the flesh, the question arises as to whether it is wise to attempt to restore it to its natural place. If a doctor can be obtained in a short time, make no such effort, but apply the dressing over the open wound and prevent further motion of the fragments as well as may be with the splints. If the patient will have to be transported for a considerable distance before he can reach medical help, it may be proper to attempt to replace the bone by pulling on lower end of the limb in the direction of its long axis. Before doing this, in all cases, the wound and the protruding end of the bone should be thoroughly painted with tincture of iodine and all visible dirt removed from the bone, so as to lessen as much as possible the danger of dragging live bacteria into the deeper tissues. If tincture of iodine is not available, do not attempt to replace the protruding fragments.

SUNSTROKE.

The term "sunstroke" denotes a sudden attack of illness from exposure or prolonged exposure to the rays of the sun; but the same condition may be produced in hot weather by exposure to high temperature not in the direct rays of the sun, particularly if the person is engaged at hard work in close quarters. Stokers on steamships are sometimes affected by the heat of the furnace. Men debilitated from or addicted to the excessive use of stimulants are more apt to suffer than those of temperate habits.

Sunstroke occurs in two forms: Heat stroke (heat fever), in which the temperature of the body is very high, and heat prostration or

heat exhaustion, in which the surface of the body is cool, sometimes considerably below normal. The difference is very important because of the different treatment required.

In severe cases of heat stroke the patient may be stricken down in a state of unconsciousness and die instantly, or within an hour or two. In other cases there may be intense headache, dizziness, marked restlessness, nausea and vomiting, and hot "burning" skin. The thermometer may register 105° F. Pulse is full and may be slow or fast. Breathing is labored—may be sighing or rattling. Patient soon becomes unconscious, the stupor deepens, and death may occur within 24 hours; or the temperature may drop, consciousness may return, and the patient get well.

In heat prostration, as already stated, the surface of the body is cool, the pulse rapid and feeble, and there is a feeling of general weakness. There may be only slight faintness and nausea, and under prompt treatment patient may rapidly recover, or, on the other hand, there may be complete loss of consciousness and a rapid and fatal termination from exhaustion.

Heat cramps.—Painful spasms of the muscles, especially those of the abdomen and limbs, may occur when persons who are exposed to high temperatures are required to perform hard labor. Stokers on steamships are liable to suffer from them. They are extremely painful, making the patient cry out; there is headache, and the bowels are constipated. In some cases the patient is unconscious, and the convulsions resemble those of epilepsy. The attacks may last from 12 to 24 hours, but even after the patient becomes quiet the spasms may be renewed by a slight stimulus, such as a cold draft or a sudden movement. The muscles are sore and the patient weak and listless for several days following the seizure. The cases vary greatly in intensity; there may be simply a slight cramp in the abdomen or in one of the muscles of an extremity.

Prevention.—The temperature and humidity of inclosed places like firerooms of ships, weaving rooms, etc., should be regulated, so as to prevent the temperature of the air from rising above 86° F. and the moisture 80 per cent. This may be accomplished by the use of fans to keep the air in motion. Cold air may be forced into these places or hot air exhausted by the same means.

Treatment.—In heat stroke (fever heat) the temperature of the body should be reduced as rapidly as possible. Place the patient in a cold-water bath, add ice, rub the body with the blocks of ice, apply ice water with ice cap to his head, and keep up the treatment until the temperature, as shown by the thermometer in the rectum, is reduced to 100° F. If the temperature rises again, repeat the treatment. If symptoms of exhaustion follow the reduction of the

temperature, stimulants should be given—strychnine sulphate, one-fortieth grain.

In heat prostration, with cool skin, weak and rapid pulse, stimulants and friction are required. Give strychnine sulphate, one-fortieth grain, rub the surface of the body and the extremities, place hot-water bottles to the feet, and cover the body with blankets. If the head is hot, apply cold water to the forehead. If vomiting occurs, inject hot salt solution (one teaspoonful of salt to a pint of water) into the rectum. Apply a mustard plaster over the region of the stomach. Mustard plasters may also be applied to the feet.

EFFECTS OF HEAT AND COLD.

SUNBURN.

Sunburn is a red and painful condition of the skin due to exposure of the surface of the body to the rays of the sun.

Treatment.—Make a lotion as follows: Take one-half a pint of hot water and stir into it a level tablespoonful of boric-acid powder; then add 20 drops of carbolic acid, and shake well. The solution should be dabbed on the inflamed skin with a small piece of cotton or sprayed on with an atomizer. It should not be rubbed into the skin. It can be applied every half hour if necessary. If no medicine is available cold compresses will give relief to badly burned areas.

BURNS AND SCALDS.

Treatment.—Of slight or small burns or scalds.

As soon as the injury is received plunge the part in cold water, preferably ice water. This checks the action of the heat and instantly stops the pain. If boiling water or soup is spilled over the leg or foot, do not wait to remove the clothing but thrust the entire part into a bucket of water or pour cold water freely over it. Keep submerged in cold water, or covered with a cold-water dressing, which is frequently renewed for 20 minutes to a half hour, depending upon the severity of the injury. Then apply a permanent dressing. There are many ways of treating burns, all of which have their advocates.

A very satisfactory dressing is plain vaseline or petrolatum molle. This is spread with a knife on clean pieces of old muslin, gauze, or similar material, just as butter is spread on bread. The prepared cloth is then cut into strips and the strips laid on the burns "buttered" side down. The plan of using several or more small strips is better than applying one large piece, as the smaller dressings come off much more easily when the burn is re-dressed. A thin layer of cotton may be applied over the muslin or gauze to protect the part from injury and the entire dressing held in place by a suitable bandage. *Never, under any circumstances, apply cotton directly to a burn.*

A good deal of fluid exudes from a burn, and this fluid will harden in the cotton and cement it firmly to the surface of the wound so that it can not be removed without great pain and interference with the healing process.

Blisters may be opened by a needle, the point of which has been passed through a flame. The dressings should be removed at the end of 24 hours and fresh ones applied. Every household should keep on hand a large jar of vaseline for the purpose of dressing burns. Boric-acid ointment makes a most excellent dressing for injuries of this sort. A substitute is made by thoroughly mixing 1 part of boric acid with 10 parts of petrolatum molle or vaseline. In the absence of vaseline use sweet oil, olive oil, castor oil, or some of the many preparations of liquid petrolatum now so extensively advised for the cure of constipation. In emergencies automobile grease or cylinder oil may be used, but always put the medicine on the dressing and then lay that on the wound rather than to attempt to spread the medicine on the surface of the burn itself. Carbolized vaseline should never be used on a burn, as the carbolic acid, if of any considerable strength, is apt to cause extensive sloughing of the part and deep ulcers, which are extremely difficult to heal. The picric-acid treatment for burns has been highly recommended and is much used, but its use should be restricted to limited burns of a rather mild degree. Some first-aid kits contain picric-acid gauze, which is first wet and then applied as a compress. Carron oil was formerly much used and is composed of equal parts of linseed oil and limewater. It is not as good as vaseline or petroleum molle and has the objection of soaking through the dressings and soiling the bed or clothing.

SEVERE EXTENSIVE BURNS.

First-aid treatment.—These require the attention of a physician if available. Such injuries are always accompanied by shock and they should be treated by absolute quiet, covering the patient with blankets or warm clothing, applying hot-water bags and the administration of stimulants such as hot strong black coffee, half a teaspoonful of aromatic spirits of ammonia in a little water, or one large drink of whisky. It may be necessary to give one-fourth grain of morphine sulphate or some preparation of opium to allay the pain. Do not place horse blankets next to the skin on account of the danger of lockjaw.

BURNS FROM CHEMICALS SUCH AS STRONG ACIDS OR ALKALIES.

These substances, when coming in contact with the skin, frequently cause burns similar in many respect to those produced by heat. The chemical should be immediately washed off as quickly as possible with a stream of running water. It is rarely advisable to

attempt to counteract the substance with some other chemical, as the proper materials for this purpose are not often at hand, and if freely flowing water is used the same effect can be produced in this manner. After prolonged washing dress the burn in any of the methods as described above.

ELECTRIC BURNS.

When a person comes in contact with a live electric wire, severe and deep burns are frequently produced.

Treatment.—Electric burns should be dressed for several days with wet dressings of boric acid solution, afterwards with dry gauze lightly spread with vaseline. Such burns are always very slow in healing.

Prevention.—All parts of the body should be kept as dry as possible, as dampness increases the tendency to frostbite. The shoes should be large, and puttees or leggings should be worn loose in order not to impede the circulation of the blood. Tight garters must not be worn. It is well to wear two pairs of stockings, a woolen pair over a cotton pair. The ears and the face, except the eyes, nose, and mouth, should be well covered, especially if snow is falling or a brisk wind is blowing. Fur-lined gloves are warmer than woolen ones. Special care should be taken of the feet; they should be washed each day and a small quantity of oil should be rubbed into them. A large amount of oil does harm; only enough should be used as can be well rubbed in, leaving a dry surface when the rubbing is completed. Clean stockings should be put on each day. Wet stockings should be changed for dry ones. If a person has to be on duty with wet feet, an opportunity should be afforded him to put on dry stockings at least every six hours. The feet are less likely to become frostbitten if a person keeps moving. If he has to stand in one place shoestrings and puttees should be loosened.

Treatment.—If a physician is present, his instructions should be followed. If the frostbite is of the first degree—that is, if the tissue is only slightly frostbitten—the part should be gently rubbed, and cloths wrung out of cold water should be applied. Snow may be rubbed on the part, but it is not as efficient as cold cloths. The rubbing and the applications should alternate, rubbing a few minutes, and then applying cloths for a few minutes. The temperature of the water in which the cloths are soaked should be gradually raised until it is lukewarm. In frostbites of the second degree—that is, where the skin is of a livid hue and blisters have formed—no rubbing should be practiced, as there is danger of increasing the damage. Cold cloths should be applied, but the cold must not be kept up too long, as cold prolongs the cause of the injury. The temperature of the water should be gradually raised a degree or two every few minutes, using fresh cloths each time the temper-

ature of the water is changed. It should be remembered that reaction takes place naturally as soon as the person is brought into the house out of the cold, even if he is treated in a cold room, and the object of treatment is to prevent this reaction from taking place too rapidly and at the same time not unduly retard the restoration of vitality. In frostbites of the third degree the same method should be followed to bring about a reaction as in those of the second degree; reaction, however, will not happen in a part that is dead, but the adjacent living tissue will react, and a red line will form between it and the dead portion.

In some cases reaction has already taken place when the person is first seen. In these cases the above treatment is unnecessary. After reaction has occurred the patient should be moved into a warm room, and an ointment composed of vaseline 1 ounce, camphor 6 grains should be applied. The part should then be surrounded with absorbent cotton or wrapped in flannel cloths. Boracic acid ointment may be used instead of the vaseline and camphor. Blisters that form should be pricked with a needle and the water allowed to flow out, but the covering of the blisters should not be disturbed. If gangrene occurs, cloths wet with alcohol placed over the part prevent infection and hasten the separation of the dead part from the living tissue.

A person who has been exposed to a low temperature or submerged in cold water should be placed in a cold room, and artificial respiration should be performed. The extremities should be rubbed with a solution composed of equal parts of alcohol and water. When the patient begins to react, the temperature of the room should be slowly raised, and the patient should be given hot drinks, coffee, tea, or chocolate. If the patient is unable to swallow, a pint of hot coffee or tea should be injected into the rectum. Efforts to restore animation should be continued for an hour or two, as persons have been brought to life after being apparently dead.

SUFFOCATION.

It is necessary that fresh air should be constantly entering the lungs and used air expelled if life is to be maintained. When this process is stopped or markedly obstructed, suffocation results.

Most cases of suffocation are treated by removing the direct cause and performing artificial respiration. To do this properly, the operator should have some knowledge of the system.

The Schaefer method.—The collar is removed and shirt band loosened. The patient is laid on the ground, face downward. The arms may be raised about the head, one arm flexed, so that the forehead rests upon it. The face must be turned slightly to one side, so that the nose and mouth will not be closed by pressure

against the ground. The operator stands or kneels astride of the patient and places his hands close together, one on each side of the backbone at about the region of the short ribs—that is, about the middle of the body. The operator now leans forward and throws his weight on this hands, which are against the back, thus pressing the lower part of the chest against the ground and also to a certain extent forcing the belly contents up against the diaphragm. The effect of this double procedure is to decidedly diminish the capacity of the chest and air is forced out. The pressure is applied firmly but gently, and then removed by the operator bending his body backward and taking the weight off his hands. The removal of pressure causes the chest to expand and the organs of the abdomen to recede by their own elasticity, and this expansion of the chest cavity draws air into the lungs through the windpipe. The operator pauses for about three seconds to allow the fresh air to become mixed with the blood and then repeats the process. These alternate procedures of compressing the chest and then relieving it and pausing for three seconds are continued rhythmically until the patient begins to breathe himself. The movements are performed at the rate of about 12 to 14 times per minute. It takes about a second before the air is all out and a second for it to enter, and the three seconds' pause makes it a total of five seconds for the complete cycle. The hands should remain in the proper position upon the back after the pressure has been removed, but no weight should be placed upon them. The operator swings his body backward and forward with the least possible exertion, and on this account is able to keep up the movements for a long time without undue fatigue. It may be necessary to perform artificial respiration for several hours, or even longer. In rare instances it has been kept up more or less continually for several days. In any event, it should be tried for at least an hour and a half. A good rule is that artificial respiration in suffocation cases should be performed until it is certain that the individual is dead, and then continued for an hour and a half longer. Many persons who were apparently lifeless have been finally restored by long-continued efforts.

When the air enters and leaves the chest it makes a very audible sound in passing through the paralyzed throat. If this sound is not heard it may be inferred that the method is not being properly applied.

When the patient begins to breathe voluntarily in a regular manner, he should be turned on his back and suitable measures toward keeping him warm applied. Later on when he is conscious and can swallow, stimulants are administered such as hot black coffee or aromatic spirits of ammonia. The limbs should be vigorously rubbed toward the heart to assist in restoring the circulation and bringing up the

body warmth. If vomiting occurs, turn the head to one side so that the vomited matter will run out of the mouth and not get back into the lungs. When breathing is fully established and the general condition good, the patient should be put in bed, warmly covered, and if he is cold external heat applied. Care should be taken to see that he has plenty of fresh air.

Various mechanical devices, such as pumps or bellows, connected with face masks or similar appliances, have been devised for the purpose of performing artificial respiration. Many of these machines have been widely advertised and highly recommended. A more extended trial, however, has demonstrated that some of them are not entirely satisfactory and their use is occasionally followed by undesirable complications. Further developments along these lines may succeed in producing an apparatus, however, which will be free from any defects.

After natural breathing begins the patient must be carefully watched because it may fail and artificial respiration be again necessary.

In all cases of suffocation send for a doctor, if available, but do not wait for his arrival before starting artificial respiration. This should be commenced immediately, as a few moments' delay may mean the loss of a life. The method of performing artificial respiration is the same in all cases of suffocation.

Causes of suffocation.—These are submergence of the body in water, the breathing of certain gases, a foreign object in the throat, strangulation, and sometimes swelling of the upper air passages.

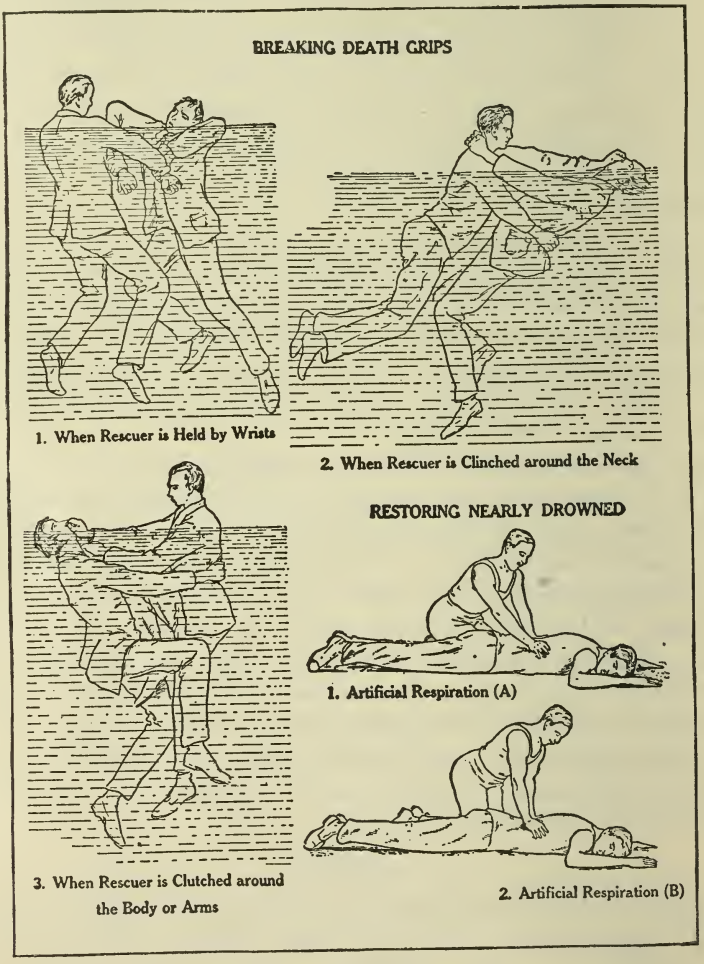
Symptoms of suffocation.—When a person for any reason is not getting sufficient fresh air the face becomes blue or almost black, the veins stand out, and he fights frantically for breath. If relief is not obtained, the efforts to secure air become more violent and the duskiness of the face increases. Convulsions may occur, but finally unconsciousness sets in, to be followed shortly by death. A person who has been apparently dead from suffocation for several minutes or longer may frequently be revived if the cause is quickly removed and artificial respiration immediately started.

DROWNING.

Prevention.—Ordinary care and caution will do much to prevent accidents in the water. Inexperienced persons should not attempt to handle sailboats or even rowboats. Pleasure craft should not be overloaded nor attempts be made to change seats in small boats except with great caution.

The swimmer should be careful not to overtax his strength, not to remain in the water too long, nor to get so far out that he might be caught by the undertow. Every child should be taught to swim, and all parents should appreciate the necessity of their children being given this training.

Rescue of drowning persons.—If possible, do not attempt to rescue a drowning person in deep water by entering the water yourself. The best interests of the drowning person are served, when practical, by holding out or throwing something into the water on which he can support himself till he can be pulled ashore or reached in a boat. In case a person has fallen into deep water near the shore take an oar, a pole, a rope, or even your coat and hold it out so the drowning person may grasp it. Life preservers, boxes, boards, or logs may also be thrown into the water close to the person drowning. As has been stated above, a small, floating object is quite sufficient to sustain a person's weight in the water.


BREAKING DEATH GRIPS
1. When Rescuer is Held by Wrists
2. When Rescuer is Clinched around the Neck
3. When Rescuer is Clutched around the Body or Arms
RESTORING NEARLY DROWNED
1. Artificial Respiration (A)
2. Artificial Respiration (B)

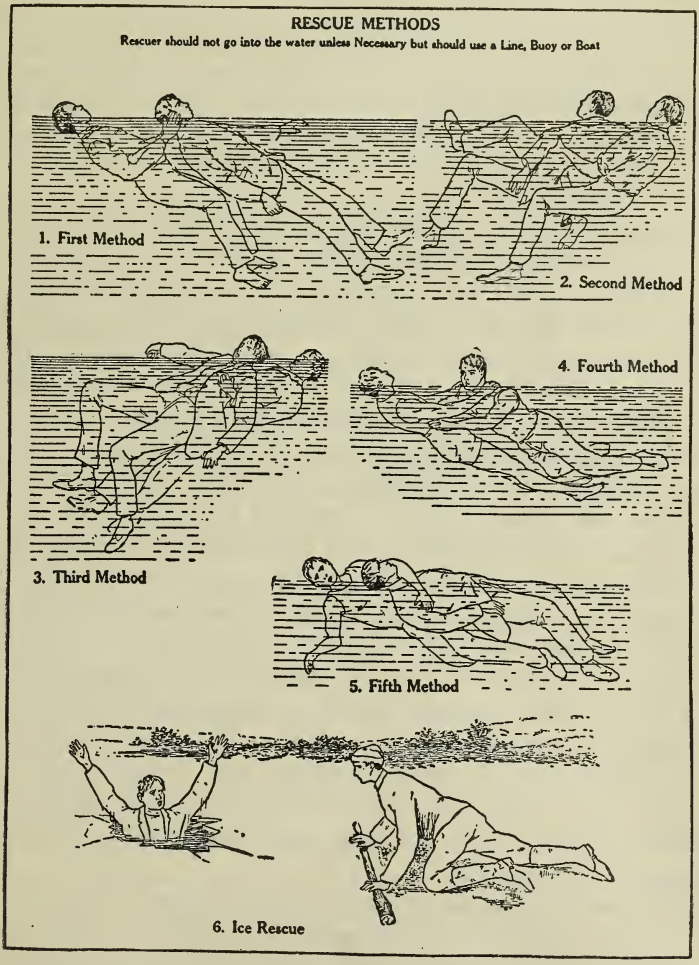
INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF.

1. When you approach a person drowning in the water, assure him, with a loud and firm voice, that he is safe.

2. Before jumping in to save him, divest yourself as far and as quickly as possible of all clothes; tear them off, if necessary; but if there is not time, loose at all events the foot of your drawers, if they are tied, as, if you do not do so, they will fill with water and drag you.

3. On swimming to a person in the sea, if he be struggling, do not seize him then, but keep off for a few seconds till he gets quiet, for it is sheer madness to take hold of a man when he is struggling in the water; and if you do, you run a great risk.

4. Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible onto his back, give him a sudden pull, and this will cause him to float, then throw yourself on your back also and swim for the shore, having hold of his hair, you on your back and he also on his, and, of course, his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you


RESCUE METHODS
Rescuer should not go into the water unless Necessary but should use a Line, Buoy or Boat
1. First Method
2. Second Method
3. Third Method
4. Fourth Method
5. Fifth Method
6. Ice Rescue

can easily thus swim with two or three persons. One great advantage of this method is that it enables you to keep your head up, and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair and throw both the person and yourself on your backs. After many experiments, it is usually found preferable to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

5. It is believed there is no such thing as a death grasp; at least it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose his recollection, he gradually slackens his hold until he quits it altogether. No apprehension need, therefore, be felt on that head when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air bubbles, which will occasionally rise to the surface, allowance being, of course, made for the motion of the water, if in a tideway or stream which will have carried the bubbles out of a perpendicular course in rising to the surface. Oftentimes a body may be regained from the bottom before too late for recovery by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom the hair of the head should be seized by one hand only and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try to get to land. If there be a strong "outsetting" tide, and you are swimming either by yourself or having hold of a person who can not swim, then get on your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide and sinks in the effort, when if he had floated a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

The popular idea that a drowning person rises to the surface three times is apparently incorrect. Some persons never come to the surface at all. Others come up but once, so no assumption should be made that the rule of coming up three times will always hold true.

When a person has been brought to land or other safe place, if he is unconscious, the first procedure is to get the water out of the lungs. To do this roll him on his face, stand astride of the hips, and clasp the hands under the lower part of the abdomen. Lift up the hips and abdomen by straightening the back. This will cause the head to be lower than the lungs and the water will run out of the mouth. Hold in this position for a few moments, or as long as the water runs out of the mouth, giving the body several slight shakes. Then sweep the finger into the mouth to see that the throat is not clogged with sand, seaweed, or other matter, remove tight clothing from around the neck or throat and begin artificial respiration immediately. It is not necessary to roll an apparently drowned person over a barrel to get the water out of him. Attempts at resuscitation on a beach should not be made with the part of the body submerged in the water or in such a position that a wave may sweep over the unconscious person. It is better to drag him well up where he will be dry and out of danger.

Artificial respiration on apparently drowning persons should be carried out as directed for suffocation. As soon as the person is revived and the breathing is satisfactory he should be taken to some warm place, the extremities rubbed, and suitable general remedies administered.

ELECTRIC SHOCK.

Many of the wires strung about city streets carry powerful electric currents. If such wires become broken or sag down, passers-by may come in contact with them and receive severe and possibly death-dealing shocks.

Prevention.—Broken wires of any sort dangling from their poles should not be touched. They may carry dangerous currents themselves or be temporarily charged, because they are somewhere resting on live wires.

Symptoms.—In severe electric shock there is sudden loss of consciousness, the breathing is apt to be entirely arrested, and the pulse weak. Burns may be caused by the arcing of the current where the wire has touched the body.

Treatment.—The first thing to be done is to break the contact of the person with the wire or third rail; great care must be exercised in doing this or the helper may be as badly injured as the original victim. The body of a person lying upon a conductor is fully charged with the electricity, and it is dangerous to touch it with bare hands unless the body of the assistant is thoroughly insulated. The coat, however, may be grasped, and possibly the injured person can be dragged from the wire in this manner without actually touching the flesh. If absolutely necessary to take hold of the body, wrap the hands in several thicknesses of dry cloth, rubber sheeting, or dry newspapers, and stand on a dry board or other nonconductor if possible.

A live wire may be removed from an unconscious person by lifting it off with a dry pole, wooden walking stick, or some similar article made of wood, which is a nonconductor. The wood must be dry, however. The person endeavoring to perform the rescue should in all cases stand on a dry board if it is obtainable. A number of newspapers, or the operator's folded coat, will answer the same purpose in an emergency. Rubber overshoes and heavy rubber gloves furnish good protection. If the powerhouse is near or there is a switch in the locality, it may be better to attempt to have the current turned off rather than to try other procedures. If the live wire is so twisted around the body that it is necessary to cut it, use an ax or hatchet with a wooden handle. Be careful that the cut end does not strike the operator.

When a wire is taken off the body or a person removed from the wire, this should be done with one motion if possible, because if the wire touches the person several times burns will be received at each contact.

After the person has been removed from the current, if he is not breathing, artificial respiration should be immediately performed followed by the usual restorative measures as described before.

GAS POISONING.

Gas poisoning is a frequent accident, especially in the larger cities and towns where gas is used for illumination purposes. Various gases may be detrimental when inhaled for a considerable period,

the amount of injury depending upon the nature of the substance, and even apparently innocuous gases, such as carbon dioxide, may cause death, not by their direct action but by depriving the patient of air because they have replaced it, and the patient is not getting oxygen. Gases like ammonia or chlorine may quickly produce death from shock and irritation. Recently deaths have been reported from the gas generated by an automobile engine running in a small garage which was tightly closed on a cold morning. The use of poisonous and irritating gases in warfare has been developed to a great degree in the present European war.

Firemen are frequently overcome from the effects of smoke and the products of combustion from wood, varnish, and other materials in burning buildings.

By far the greater number of cases of suffocation due to gas in this country are caused by illuminating gas. Many persons use this method of committing suicide.

Prevention.—A gas burner should never be turned down low and allowed to burn all night in a room in which persons are sleeping, as the flame may be extinguished by a change in pressure or a slight draft and later the room become filled with gas. When going into burning buildings which are filled with smoke it is well to tie a cloth wet with water around the nose and mouth. As the air is generally purer near the floor than at the ceiling, the person should, if necessary, walk on the hands and knees or crawl on the floor. In entering a room or other place which is full of gas to remove a suffocated person take several deep breaths of pure air outside and spend as brief a time in the compartment as possible.

Symptoms of illuminating-gas suffocation.—Preliminary signs are headache, dizziness, nausea, feeling of sleepiness and langour, and a rapid pulse. In later stages when unconsciousness comes on, the face and hands are blue, heart action is very rapid and weak, and breathing may be shallow or entirely suspended.

Treatment.—The patient should always be immediately removed to where the air is fresh and good. If he is only slightly affected, walk him up and down in the open air and give some effervescing drink, such as soda water, Weiss beer, or a teaspoonful of baking soda in a glass of water. This will cause belching of the gas and relief from nausea.

In more severe cases, when the patient is more or less unconscious but still breathing, sprinkle a few drops of ammonia water on a handkerchief and allow the patient to take one breath with this under his nose, once a minute. Rub the arms and legs briskly toward the heart to promote the circulation. If the patient is conscious enough to swallow, give one-half teaspoonful of aromatic spirits of ammonia in half a glass of water.

If breathing has ceased, begin artificial respiration at once, after loosening the collar or any tight clothing around the neck and chest. Have an assistant give whiffs of ammonia, as described above, and also rub the extremities toward the heart; but do not let these procedures interfere with the artificial respiration, which must be continued without interruption until the patient begins to breathe of his own accord in a regular manner.

The after treatment is rest in bed with appropriate stimulation. In severe cases the patient should be kept in bed until he has fully recovered, as dangerous symptoms have followed getting up too early.

UNCONSCIOUSNESS.

Description.—A person is unconscious when he does not realize what is going on around him. Unconsciousness may be complete or partial. In the latter case the individual can be aroused, but is not fully in the possession of his senses.

Causes of unconsciousness.—All forms of unconsciousness are due to a disturbance of the brain of some sort. The causes which act on the brain and produce this condition are many and varied. A blow on the head or pressure on the brain from a large blood clot or a depressed fracture of the skull may cause unconsciousness. A lack of blood supply to the brain produces the same condition as in fainting. Certain drugs, like opium, ether, chloroform, or large amounts of alcohol when circulating in the blood affect the brain and are followed by loss of consciousness. Such substances may be absorbed from the stomach or inhaled and taken up by the lungs. The system itself may produce poisons which are not gotten rid of and unconsciousness follows. This frequently occurs before death from diabetes. Finally, unconsciousness may be a symptom indicating a disease of the nervous system such as epilepsy.

An unconscious person is absolutely helpless and especially dependent on his friends or whoever happens to be near for aid and protection from harm. However, a word of warning concerning the handling of unknown unconscious individuals in public places may not be amiss. It is not wise to follow a perfectly natural impulse to search the clothing or to look through the pocketbook of an unconscious person to ascertain his name and address. Such an act may be interpreted by the bystanders as an attempt at robbery, and unpleasant complications result. These measures should be left to the police or other persons of recognized authority.

GENERAL RULES FOR THE EXAMINATION OF UNCONSCIOUS PERSONS.

1. Feel the pulse at the wrist and form an estimate of its rate and force. A rapid, weak pulse indicates a dangerous condition. A strong pulse, beating between 76 and 90, is a good sign.

2. Determine whether the person is breathing or not and the nature of the respirations; whether they are slow or fast, deep or shallow.

3. Note the color of the face.

4. Observe if the skin is hot or cold and the presence or absence of perspiration.

5. Examine the eyes to see if the pupils or black spots in the middle of the eye are small or large. Compare the two eyes to see if the pupils are of the same size.

6. If the person has evidently been the victim of an accident, look for hemorrhage and feel the head to detect possible fractures of the skull.

7. Take into consideration the surroundings and other general conditions. When the heat is excessive, heat strokes are a common cause of unconsciousness. An empty bottle near by may suggest attempted suicide by poisoning. Signs of a struggle might indicate an assault, with brain injury.

FAINTING.

Fainting is a temporary loss of consciousness due to insufficient supply of blood to the brain.

Some persons faint very much more easily than others. The tendency toward fainting does not always depend upon the physical strength, and strong men sometimes faint from very slight causes.

Persons may faint from exhaustion, weakness, hemorrhage, extreme heat, lack of air, or some emotional shock, such as fear or the sight of blood. There is a very important mental element in almost all fainting attacks.

Symptoms.—A feeling of weakness comes over the patient and black spots float before the eyes. The face becomes pale or greenish yellow, and the lips lose their natural color. Cold perspiration breaks out on the forehead. There is a tendency to yawn; the pulse is rapid and weak and the respirations are very shallow. Finally, the patient sinks back in his seat or falls to the ground unconscious.

Treatment.—When the beginning of the attack is felt or noticed, it may be possible to check it by lowering the head between the knees. If in spite of this the symptoms continue, immediately place the patient in a recumbent position and lower the head. When a couch or bench is available, lay the person on it with the head hanging over the end or side. The color of the face is a good indicator of the blood supply of the brain. A pale face indicates a lack of blood in the brain. Lowering the head causes the blood to go to the brain by gravity. As a general rule in all accidents, if the face is pale, lower the head. If the face is red, raise the head on a pillow or coat.

It is important that the fainting person should have plenty of fresh, cool air. This alone will often bring about recovery. Dashing cold water on the face or chest is useful. Smelling salts or a few drops of ammonia water on a handkerchief held under the nose at intervals of a minute apart, until the patient has taken one breath, and fanning the face, will assist in recovery, but ordinarily all that is required is a recumbent position with the head low. When the patient becomes conscious give one-half a teaspoonful of aromatic spirits of ammonia in water if available. Do not permit the person to get up or attempt to walk until he or she is fully recovered.

FITS.

Fits are a symptom of a disease called epilepsy in which the patient goes into a more or less violent convulsion with gnashing of the teeth and frothing at the mouth and then falls unconscious. These attacks may occur at rare intervals or as frequently as several times a day. The attacks differ greatly in their severity as well as their frequency. The period of unconsciousness may be only momentary or may continue for several hours. The patient is apt to bite his tongue during the convulsion or to fall and injure himself by striking some hard object.

Treatment of the convulsion.—Do not attempt to prevent the movements or to break the grip as the fit can not be checked in this way. Lower the patient to the ground or floor and simply protect him from harm by gentle restraint and guard against biting the tongue by inserting a piece of wood or a wad of paper between the teeth and holding it in place.

No effort should be made to arouse the person from the period of unconsciousness which follows, but he should be warmly covered and placed in a safe place and allowed to sleep until he awakens naturally.

In examining unconscious persons in which a fit is suspected always look at the tongue and also the forehead and face. If the tongue is badly scarred, or if there are many old scars around the forehead, it is strongly presumptive that the person has epilepsy. In the unconsciousness following an epileptic attack the pulse is good, the breathing is regular, the face is slightly pale, and the pupils are equal.

BRAIN INJURIES.

Concussion.—By concussion is meant a shocking or jarring of the brain substances such as follows a blow on the head.

Symptoms.—The symptoms are dizziness, nausea, and more or less loss of consciousness, depending upon the severity of the injury.

Treatment.—Place the person in a recumbent position with the head slightly raised and allow him to react. Stimulate by placing a few drops of ammonia water on a handkerchief and every minute

hold it under the nose until the patient has taken one breath. Too much ammonia is very irritating hence the patient should be given only an occasional whiff of the gas. When he can swallow administer one-half teaspoonful of aromatic spirits of ammonia in a little water.

APOPLEXY.

Apoplexy, or a stroke as it is sometimes called, is due to the spontaneous rupture of a blood vessel in the brain and the resulting hemorrhage into the brain substance. Apoplexy generally occurs in elderly individuals, especially those who are of the type known as full-blooded. Reference is often made to hardening of the arteries, which is a frequent cause of apoplexy. In certain persons the arteries lose their elasticity and actually become hard. The artery at the wrist may be felt through the skin, somewhat resembling a hard cord or a pipestem. When a general hardening of the arteries takes place throughout the body the blood pressure rises and the arteries are weaker than normal. The arteries in the brain are not supported by the surrounding tissues, hence rupture of a vessel is more apt to take place here than in other parts of the body.

Symptoms.—These are practically the same as those of compression. The patient suddenly or gradually becomes unconscious. The pulse is generally weak and rapid, but may at first be unusually slow and strong. The breathing is slow, the patient snores, and the lips and cheeks puff out at every expiration. The mouth is drawn to one side and the patient, if he endeavors to talk, talks out of that side. The face is red and the skin warm. The pupils are unequal. If the patient is unconscious he can not be aroused. There is usually paralysis of one side of the body.

Wounds of the brain.—Severe head injuries may be accompanied with actual wounds of the brain or escape of the brain substance.

Symptoms.—These are varied, depending upon the location of the injury and the amount of damage done, but generally resemble either severe concussion, compression, or both.

Treatment.—First-aid treatment of compression of the brain, brain injury, and apoplexy is the same. Raise the head on a pillow, give plenty of fresh air. Send immediately for medical help. Pending the arrival of the doctor cold cloths may be laid on the head, if there is no wound of that region. *Do not in any case give alcoholic stimulants.*

POISONING.

GENERAL COMMENTS.

The symptoms of poisoning depend upon what poison has been taken. Many poisons produce nausea, vomiting, purging, and collapse. Others bring on convulsions, or spasms, and a few cause the

patient to become gradually unconscious without any other striking symptoms.

In endeavoring to determine what poison has been taken, if no information can be obtained from the patient, an examination of the surroundings may throw light on the case. An empty bottle may be discovered in the vicinity or some of the substance may have been spilled over the floor or clothing which can be smelled and otherwise examined. It may be ascertained that certain poisons were in the house and one of these may show signs of having been recently opened or handled. Always smell the breath and examine the mouth. The mouth may be stained or burned by certain chemicals in a characteristic way, such as follows drinking carbolic acid or other strong acids.

If the patient has taken a drug accidentally he will, of course, be willing to tell what it was, if he is conscious.

A skilled physician is often able to decide from the symptoms what poison has been taken, but this can not be expected of a layman. Always send immediately for a doctor if poisoning is suspected, but pending his arrival certain first-aid measures may be undertaken.

General treatment of all poisoning.—In the absence of a direct knowledge as to just what to do, the following line of procedure is recommended:

First. Give the antidote if it is known and available. Lacking the proper antidote, white of eggs, milk, or strong tea may be administered, as they will do no harm and are somewhat antagonistic to a number of common poisons.

Second. Get the poison out of the stomach as promptly as possible.

After administering the antidote the stomach should be emptied as quickly as possible. The antidote is expected to combine with the poison and render it harmless, but it may not be effective, or the resulting mixture may be harmful if afterwards absorbed. To cause vomiting, tickle the back of the throat with the forefinger or give an emetic.

Emetics.—Emetics are substances which produce vomiting. The ones most available are luke-warm water mixed with mustard or common salt. A heaping teaspoonful of mustard or salt to a cupful of like-warm water—stir it and have the patient drink the mixture. Repeat the dose every 10 minutes until 3 or 4 tumblerfuls have been swallowed if vomiting does not occur sooner. It is well to cause the patient to vomit several times and to have him drink freely of luke-warm water in the intervals. This process assists in washing out the stomach. One or two teaspoonfuls of sirup of ipecac or wine of ipecac are good emetics. Such preparations of ipecac are often kept in the home to administer to children with croup.

There are a few poisons in which it is not wise to give an emetic, but in an emergency, in the absence of a doctor and specific knowledge to the contrary, the general rule for giving an emetic holds.

Third. After giving the emetic and producing vomiting, the various symptoms which arise should be treated according to the nature of the case.

If the pulse becomes rapid and weak, hot coffee, one-half teaspoonful of aromatic spirits of ammonia, or small doses of whisky or brandy should be given. If the patient is greatly weakened and prostrated, as he generally will be, hot-water bottles should be applied around the feet and extremities and measures taken to sustain the general strength.

WARNING.—Poisons, such as carbolic acid or antiseptic tablets, should not be kept on the same shelf with harmless remedies. Such drugs should be kept in a separate place or in a special box and well out of the reach of children. Poisonous solutions should never be left in drinking glasses, as children or even adults may drink them without the knowledge of their dangerous character.

PTOMAINE POISONING.

Certain kinds of bacteria when they grow in some foods, especially fish, shellfish, and mixtures of eggs with cream or milk, produce highly poisonous compounds called ptomaines. The eating of such contaminated food is followed by ptomaine poisoning. The formation of the ptomaines in food is favored by warm weather and long keeping.

Symptoms.—Headache, pain in the muscles, nausea, thirst, intense pain in the stomach, vomiting, and purging. The patient rapidly grows very weak and in severe cases goes into collapse. The symptoms may come on immediately after the food has been eaten or may not appear for some hours.

Treatment.—If vomiting has not occurred, give an emetic. Also administer a rectal injection of a pint of soapsuds to quickly empty the bowel. Follow the emetic in half an hour with a large dose of castor oil. Keep the patient in bed, administer stimulants if necessary, such as small doses of strong coffee or a tablespoonful of whisky every two hours. Surround the extremities with hot-water bottles. Keep the patient warm.

Vomiting can be held in check by small drinks of plain soda water, ginger ale, or of iced champagne if available. No food should be allowed until the acute symptoms have subsided, and then only a liquid diet in small quantities at first.

A characteristic feature of true ptomaine poisoning is that the patient remains weak for a long period and that recovery is very slow, oftentimes requiring several weeks.

LIST OF REMEDIES AND THEIR USES.

DOSES.—Unless otherwise stated, the doses mentioned in this book are intended for adults. To determine the dose for children, add 12 to the age of the child and divide the age of the child by this sum. This fraction will represent the size of dose compared with that for an adult. For example, a child 6 years old will require $\frac{6}{6+12}=\frac{6}{18}$, or one-third of the adult dose.

CAUTION.—Preparations containing opium, such as laudanum, paregoric, camphor and opium pills, Sun Cholera Mixture tablets, etc., should not be used except where absolutely necessary, as their continued use is liable to produce the drug habit.

Alcohol.—Externally is useful as a mild antiseptic wash for wounds. As a liniment, pure or diluted with from 1 to 3 parts of water, is cooling and stimulating.

Aromatic spirit of ammonia.—Useful in hysteria, faintness, headache, flatulent colic, nervous debility, and as a stimulant in shock. Dose: ½ to 1 teaspoonful in water every half hour until three doses are taken.

Belladonna plaster.—Useful in coughs, colds, rheumatism in joints and arms, lumbago, and pains in small of back. Should be worn only long enough to have the desired effect. If the throat becomes dry or the pupils dilated, indicating belladonna poisoning, the plaster should be removed.

Bicarbonate of soda (*baking soda*).—Internally useful in sour stomach and heartburn. Dose: ½ to 1 teaspoonful in half tumbler of water. Repeat in half an hour if necessary.

Bismuth subnitrate (*5-grain tablets*).—Useful in dysentery, diarrhea, and heartburn. Dose: 2 to 4 tablets every three hours. (Crush before taking.)

Borax.—Useful in sore mouth. One tablespoonful dissolved in a pint of water and used as a mouth wash several times a day.

Boric acid (*boracic acid*).—One-half teaspoonful may be dissolved in a glass of water and used as a lotion for the eyes or ears.

Bromide of potash (*5-grain tablets*).—Useful in convulsions, and delirium tremens. Dose: 3 to 5 tablets, dissolved in water, three times a day.

Brown-mixture lozenges.—Useful in bronchitis, coughs, and colds. Dose: 1 lozenge allowed to dissolve slowly in mouth; to be repeated as required.

Calomel (*$\frac{1}{10}$-grain tablets*).—Useful in constipation and dysentery. Dose for adults and children: Take 2 tablets every 15 minutes until 20 tablets are taken. When from 4 to 6 hours have elapsed a Seidlitz powder or a dose of Rochelle or Epsom salt should be taken. The

dose of the Seidlitz powder or salt should be proportionate to the age of the patient.

Camphorated oil (for external use only).—In sprains, bruises, neuralgia, rheumatism, and pains and swellings of the breasts or joints it should be gently rubbed on the painful part. Applied on hot flannel to chest and neck for colds.

Carbolic acid, liquid (poison).—Useful as an antiseptic and disinfectant when mixed in the proportion of 1 part of acid to 100 parts of hot water. Useful without dilution to arrest the development of boils and carbuncles and as an application to ulcers and venereal sores. Should be applied cautiously. The surface should be merely touched with a small piece of cotton moistened with a drop of the acid, care being taken not to burn the surrounding skin. Do not use internally.

Castor oil.—Useful in constipation. Dose: 1 to 2 tablespoonfuls.

Compound carthartic pills, vegetable.—Useful in constipation. Dose: 1 to 3 pills at night.

Compound solution of cresol.—Useful as antiseptic and disinfectant when mixed with water in from 1 to 3 per cent solutions. Do not use internally.

Epsom salt.—Useful in constipation and dysentery. Dose: 1 to 2 tablespoonfuls dissolved in as little water as possible. A little lemon juice and sugar may be added to disguise somewhat its bitter taste.

Essence of peppermint.—Useful in cramps, colds, gas in stomach, and colic. Dose: 10 drops to ½ teaspoonful in sweetened water or on sugar. Externally is useful in rheumatism, neuralgia, and toothache.

Flaxseed meal.—Useful as hot poultice to apply to boils and felons. Compresses wet with hot bichloride solution, 1 tablet to 5 pints of hot water, are better. To prepare flaxseed poultice a receptacle containing boiling water should be placed on the fire, the flaxseed meal should be gradually added and constantly stirred until the batter is jellylike. This should be evenly spread, with a thickness of from ¼ to ½ inch, to within 2 or 3 inches of the border of a cloth prepared for that purpose by folding in two or three layers. To prevent the poultice from adhering to the skin any of the following may be placed on its surface: Gauze, mosquito netting, cheesecloth, vaseline, or sweet oil.

Formalin (poison).—Used as a disinfectant generally in connection with permanganate of potash, as follows: For every 1,000 cubic feet of room space to be disinfected use ½ pound of permanganate of potash, powder or crystals, and from 1 to 1¼ pints of formalin. Add the permanganate of potash to the formalin contained in a deep tin pail. Effervescence begins at once, the room is tightly closed, and the operation is over in about 10 minutes. After 12 hours the room is opened and aired.

Glycerin.—Is a mild and healing application for sores, chaps, etc. When mixed with an equal quantity of water is useful in earache, hard, irritated, or feverish skin, chapped face or hands, split lips, and chafing.

Lead and opium wash (*poison*) (*shake well before using*).—Soothing external application in sprains and bruises.

Lemon juice.—Useful in fevers and inflammatory complaints. Hot lemonade on retiring is useful to aid in the relief of a cold in its first stages.

Lime water.—Internally is useful in soothing sick stomach, heartburn, diarrhea, and in dyspepsia attended with acidity of the stomach. Dose: 1 to 3 tablespoonfuls. For sick stomach, to be repeated after each effort to vomit. Externally as liniment (mixed with an equal quantity of linseed, cottonseed, or olive oil) for burns and scalds.

Mustard.—Externally is useful to draw the blood to the surface in case of pain where skin is not broken. Should be employed as a plaster or poultice, made as follows: 1 part of mustard is thoroughly mixed with from 2 to 4 parts of flour and made into a paste by the addition of a small amount of tepid water. This is then spread thinly to within 1 or 2 inches of the border of a cloth prepared by folding in two or three layers of old cotton cloth. The amount of mustard depends upon the degree of pain, the age of the patient, etc. Care should be taken that the mustard does not blister the skin. As a rule, mustard plasters or poultices should not be applied to children and old people, as they may blister the surface. Internally given to produce vomiting, 1 tablespoonful stirred to a cream with a cupful of tepid water.

Olive oil (*sweet oil*).—Internally is useful in constipation. Dose: 2 to 3 tablespoonfuls. Externally is a soothing application to blistered, burned, scalded, or other injured surfaces, also to piles.

Oil of wintergreen (*methyl salicylate*).—Useful, when mixed with an equal amount of olive oil, as an application for the relief of neuralgia, rheumatism, and painful joints. The oil should be gently rubbed on the painful area. If used about the head care should be taken that none gets into the eyes.

Permanganate of potash.—Useful in gonorrhea as an injection: ¼ teaspoonful dissolved in 2 quarts of water. One teaspoonful to a quart of water makes an efficient wash for perspiring feet. Useful in snake-bites in the form of a concentrated solution which should be injected freely and immediately into and around the part which has been bitten. Useful as a general antiseptic in solution (1 tablespoonful dissolved in a quart of water). As a disinfectant, see "Formalin."

Peroxide of hydrogen solution.—Is cleansing and slightly antiseptic. Useful as a gargle in sore throat, diluted with an equal quantity of water. Useful to apply to wounds, boils, and abscesses, after diluting with from 1 to 3 parts of water.

Picric acid (poison) dissolve in water (½ per cent solution).—Useful to wet dressings with, as an application to burns.

Syrup of ipecac.—Useful in croup, bronchitis, cough, and hiccough. Dose: 10 drops every three hours. Also used to produce vomiting in doses of 1 to 2 tablespoonfuls.

Soap liniment (for external use only).—Useful in rheumatism, sprains, and bruises.

Spirit of Camphor.—Internally is useful in nervous diarrhea, colic, and cramps. Dose: 5 to 30 drops, first added to sugar and then mixed with water.

Sun Cholera Mixture (poison) (15-minim tablets).—Useful in diarrhea, dysentery, and cholera morbus. Dose: 1 tablet.

Sweet spirits of niter.—Useful in fevers, flatulent colic, and colds. Dose: ½ teaspoonful in sweetened water every four hours.

Tincture of green soap.—Cleansing hands.

Tincture of iodine (poison) (for external use only).—Useful to disinfect wounds; should be diluted with an equal quantity of alcohol or water. If painted over inflamed surfaces, will sometimes be of value.

Turpentine.—Used in the form of hot turpentine stupes in typhoid fever, pneumonia, colds, bronchitis, lumbago, pleurisy, and inflammation of the bowels. The stupes are prepared by wringing a double layer of thin flannel out of a pint of hot water with which a teaspoonful of turpentine has been mixed. These applications should not be prepared too close to a fire on account of the inflammability of the turpentine.

Vaseline.—Internally and externally useful for the relief of cold in the chest. Externally useful in cold in the head, soothing irritated surfaces, burns, and scalds, and as a protective dressing.

LIST OF SURGICAL SUPPLIES FOR MEDICINE CHESTS.

One adhesive plaster, 10-yard reel, 1 inch wide.
One dozen applicators, small, wooden.
One dozen bandages, 2-inch by 3-yard (½ dozen gauze and ½ dozen muslin).
One dozen bandages, 2-inch by 5-yard (½ dozen gauze and ½ dozen muslin).
One dozen bandages (4-inch by 5-yard muslin).
Six bandages, triangular (Esmarch's bandage), with figures printed on them showing the various ways they can be used.
One bistoury.
Three camel's-hair brushes.
One catheter, rubber, No. 20 F.
One corkscrew.

One forceps, artery (hemostatic forceps). This can be used to grasp a bleeding vessel until it can be tied, or until the doctor arrives. A catch holds the grip of the forceps. Sterilize by boiling.

One forceps, dressing or dissecting. Will be found convenient in cleaning up a wound and applying dressings; also in removing splinters, etc. Sterilize by boiling.

One fountain syringe, 2-quart.

One urethral syringe, glass. (For washing out wounds.)

Five yards gauze, picric acid. Good dressing for wounds and scalds.

Five yards gauze, plain, sterile.

One hot-water bottle, rubber 2-quart. Metal bottle preferred.

Six medicine droppers.

One medicine glass.

Two nail brushes.

Two dozen safety pins, large.

One scissors, dressing, surgeon's, for cutting gauze and bandages. Sterilize by boiling.

One shears, for cutting cotton and muslin, etc.

Three splints, wooden. Straight and angular splints made of thin board, as described in chapter on "Fractures."

One spool of silk ligature, medium size.

Two surgical needles, in glass-stoppered bottles.

One thermometer, clinical, Fahrenheit.

One tooth forceps, incisor.

One tooth forceps, molar.

Two pieces wire gauze, made of heavy mesh malleable wire. When well padded can be wrapped around a fracture for temporary dressing.

Two sheets Yucca palm (a thin fiber board). Can be wrapped around a fracture for temporary dressing.

Gauze and bandages should be in paraffin-paper packages, sealed after sterilization.

Catheters and other rubber goods should be in sealed paraffin packages or envelopes, slightly dusted with sterile talcum on the inside of the package.

Scissors and instruments, if not in cases, may be coated with paraffin, which will come off when dipped in hot water.

DON'T FORGET TO CALL THE DOCTOR.

614.09
No. 21
1928

What to Do in Case of Accident

Miscellaneous Publication 21

THE LIBRARY OF THE
DEC 5 - 1928
UNIVERSITY OF ILLINOIS

Treasury Department
United States Public Health Service
1928

U. S. GOVERNMENT PRINTING OFFICE: 1928

MISCELLANEOUS PUBLICATION No. 21

Adapted from the article entitled "First Aid to the Injured" by Senior Surgeon M. H. Foster. Revised edition, 1928.

614.09
H n3m
no 21
1928

WHAT TO DO IN CASE OF ACCIDENT

In case of accident or sudden grave illness, humanity demands that those who happen to be present should take all possible measures for the relief of the afflicted person. It is entirely possible for any person of ordinary intelligence to master enough of the art of first aid to be able to give a great deal of valuable assistance pending the placing of the patient under regular medical care; and such help, if properly and promptly administered, may frequently, in severe cases, be the means of actually saving life. When a person is hurt or suddenly becomes sick it is almost as important to know what not to do as it is to know what to do; for ignorant volunteer assistants have often done their friends more harm than good by their ill-advised treatment. Knowledge of what is best to do in such emergencies can be obtained only by some training and the use of a great deal of common sense. It is therefore desirable that everyone should spend a moderate amount of time in studying at least one of the various manuals which have been prepared on this subject.

GENERAL RULES AS TO WHAT TO DO IN CASE OF ACCIDENT

The conditions under which accidents happen vary so much that it is difficult to lay down rules which will be broad enough to cover all cases, but there are certain principles which should be followed in a general way when disasters of this sort occur.

First. A rapid preliminary survey of the person should be made to determine what must be done, first of all, in any particular case. In this preliminary examination, endeavor to ascertain whether the injuries can properly be classified as serious or trivial. If the person is conscious, this information can be at once obtained upon inquiry. If unconscious, the nature of the accident will almost always decide as to the probable gravity of the case.

Second. Note quickly the surroundings.

This is for the purpose of deciding on how soon additional help can be obtained and whether the individual is in danger of further injury from the nature of the place which he is in. A person may be hurt by a falling building, or be found in a room filled with gas, and it may be likely that further injuries may be received from the

same source unless he is immediately moved, or it may be perfectly proper to permit him to remain for the present where the accident occurred.

Third. Now make a more careful examination of the patient to determine the location and nature of the injury.

Frequently in case of accident a glance at the injured person will be sufficient to determine where and how he is hurt. One leg may be doubled up in an unnatural position, part of the clothing may be torn or marked, as by the black streak left by a car wheel, or blood may be appearing on some part of the body. It may be necessary partially to undo some of the clothing to ascertain more correctly the amount and source of bleeding.

If the patient is unconscious, note the color of the face and the condition of the skin; take the pulse, examine the eyes, feel the head for a possible fracture of the skull, and observe the manner in which the patient is breathing, especially watching for puffing of the lips.

Fourth. Determine the proper course of action under the conditions present.

Having gotten some idea as to the nature and extent of the injuries, the amount of help available, and the general circumstances of the accident, all of which should not consume more than a minute or two, it is necessary to lay out and follow a definite plan of procedure, which will depend upon the facts which have been obtained. If the person is bleeding very rapidly, that must be attended to without further delay. If the loss of blood is not alarming, one can then proceed along the following lines:

If a doctor is within easy reach it may not be necessary to do more than to send one of the bystanders for him and make the patient as comfortable as possible pending his arrival. In sending for the doctor it is always best to give him as complete a statement of the nature and extent of the injury as is practicable. Then the doctor will know what instruments and other materials to bring with him. If circumstances permit, this information may be given in writing. If plenty of help is at hand, another messenger should be immediately detailed to inform some one in authority of the accident. In a shop, this would be the foreman of the shop or the superintendent of the plant; on board ship, the captain; in the street, the nearest policeman or police headquarters should be notified.

If the person is in a dangerous place or exposed to severe weather it may be necessary to move him. If the danger is very imminent this must be done at once, but all possible precautions should be taken to avoid increasing the damage already done, especially if there are any broken bones. In moving a person with a fracture the sharp ends of the bone may tear the flesh and even be driven out through the skin, creating a compound fracture, which is much more dan-

gerous than a simple one. Having moved the patient, if absolutely necessary, or if it is decided to allow him to remain where he is pending the arrival of medical help, proceed to administer first aid, being guided by the following suggestions:

1. PLACE THE INJURED PERSON IN A PROPER POSITION

Tight collars or belts should be loosened. The person should usually be kept lying down, or resting comfortably in a sitting position. If the face is pale, lower the head and have the person lie horizontally. If the face is flushed, the head may be raised on a folded coat, blanket, or other suitable material. If vomiting occurs, turn the head to one side so that the vomited matter will run out of the mouth and not flow down the windpipe, which may cause choking and, later, on inspiration, pneumonia. Do not attempt to force unconscious persons to drink water or stimulants, as they can not swallow.

2. REMOVE CLOTHING

In removing a coat or shirt to determine the amount of injury, take the clothing off of the sound side first, and then it can be more easily removed from the affected part. This will avoid the danger of disturbing a fracture. It is sometimes advisable to cut the clothing off. In such a case cut along a seam or rip up a seam. Always cut the clothing when it is necessary to examine a badly injured or crushed limb.

In removing the clothing have a due regard for the proprieties and do not expose the patient unnecessarily.

3. TREAT THE MOST DANGEROUS CONDITION FIRST

Always check serious hemorrhage before doing anything else. Put some sort of a dressing on a compound fracture before applying splints. Treat shock before dressing extensive burns. Be prepared to improvise headrests, tourniquets, splints, dressings, and stretchers out of material available.

4. PROTECT WOUNDS

All wounds should be covered promptly with some sterile material, or, if that can not be obtained, the wound should be exposed to the air and the clothing fastened back out of the way, so that it will not rub against the wound or all over it.

5. BE ON THE LOOKOUT FOR SHOCK

In severe injuries always examine for shock and administer suitable remedies if symptoms of shock are present (see p. 17). In this

connection remember that keeping an injured person warm is of great importance even though he is not in shock. It is a general rule in first-aid work to keep the head cool and the feet warm.

6. HANDLE THE CROWD

Always see that the patient has sufficient air. Keep the crowd back and do not permit the curious or overzealous to disturb the patient. Oftentimes one can get rid of objectionable bystanders who are needlessly exciting the sufferer by sending them on errands, necessary or unnecessary.

WOUNDS

DESCRIPTION

Injuries in which the skin has been opened, torn, or punctured are called wounds.

Severe wounds may inflict great damage to the muscles, bones, vessels, or internal organs, but in all wounds there is a secondary danger that severe inflammation may follow. The likelihood of inflammation exists in small wounds as well as large ones; hence, all wounds must be handled carefully to avoid this complication, as even a trivial injury like the prick of a pin has been known to result in death from this cause.

It is a matter of everyday experience that countless little cuts and scratches which every person receives during a lifetime almost always heal without trouble, no matter whether treated or not. It is also well known that occasionally these small injuries, and more often the larger ones, do not do well. The wound becomes red and painful, it throbs, the edges swell, and finally matter develops. This matter is called "pus." When the matter escapes, the pain ceases and the cut gradually heals. At other times the redness rapidly spreads, and in a short time the entire arm or leg, as the case may be, becomes involved. Taken at this stage, prompt and vigorous surgical treatment may produce a cure, but if neglected the condition steadily grows worse and sometimes ends in death.

GERMS CAUSE INFLAMMATION

Wounds become inflamed because disease germs have gained a foothold. These germs, or bacteria, are the smallest of all living things. Even when magnified by a powerful microscope they are not the fierce-looking animals with eyes, teeth, legs, etc., which are frequently represented in the newspapers, but in reality plants of the simplest kind. These minute plants occur in various forms; some resemble balls, others rods, and a few are spiral in shape similar to

a piece of broken corkscrew. Like all other plants, they require warmth, water, and food in order that they may grow and flourish. All bacteria can be killed by heat and certain powerful chemicals, such as tincture of iodine, carbolic acid, or bichloride of mercury.

Bacteria multiply by the simple process of dividing into approximately equal halves. A groove forms around the germ; it gradually becomes deeper, finally cuts the germ into two parts, and in a short time there are two where there was one before. Under favorable circumstances this process of division may occur in as short a time as 20 minutes.

VARIETIES OF WOUNDS

1. *Incised wounds.*—These are wounds in which the skin or tissues are cleanly cut with a sharp instrument.

2. *Lacerated wounds.*—Lacerated wounds are caused by some blunt instrument which tears and bruises the flesh.

3. *Punctured wounds.*—Punctured wounds are produced by narrow sharp-pointed instruments, such as nails, daggers, or bayonets. Bullet wounds are also included under this classification.

Many wounds are infected at the time they are received, because the knife or other instrument had bacteria on it and these were left in the flesh.

GENERAL PRINCIPLES OF THE TREATMENT OF WOUNDS

From what has been said concerning the action of bacteria on wounds it is evident that great care must be exercised in handling or dressing these injuries to prevent the introduction of living germs.

Sterilization.—The best way to kill bacteria is with heat. All dressings, instruments, and other substances which are used in wound dressing are, therefore, first heated, generally by boiling water or steam, and are then said to be *sterile.*

Preparation or sterilization of the hands.—The person who dresses a wound should thoroughly scrub his hands for five minutes with a nailbrush, hot water, and soap. Then the fingernails should be cut short and the spaces under the nails thoroughly cleaned out, after which the hands and nails are again scrubbed for five minutes. After the second scrubbing the hands should be rinsed in clean water and soaked for several minutes in a solution of one to two thousand of bichloride of mercury, a 3 per cent solution of compound cresol, or a mixture of 2 parts of grain alcohol with 1 of water.

Sterile dressings.—Whenever possible, all dressings which are to be used on wounds should have been previously treated with heat so as to kill the bacteria in them.

Germicides and antiseptics.—Chemicals which will kill bacteria are called germicides. Tincture of iodine and carbolic acid are good germicides. Certain substances, while they are not able to kill bacteria to any great extent, can prevent them from growing, and such chemicals are known as antiseptics. A solution of boric acid is a good illustration of an antiseptic.

DISINFECTION OF WOUNDS

If the wound is reasonably clean, it is much better simply to apply tincture of iodine. This is done by taking a clean match or toothpick, twisting a small amount of cotton around the end to make a swab, dipping the swab in the iodine, and applying a light coat first to the wound and then to the surrounding skin. When dirt and other substances have gotten into the injury, however, it is necessary to remove them.

In an emergency, if it is necessary to place the hands in the wound without washing, they should be covered with several thicknesses of sterile gauze, as this will assist in preventing infection of the wound. After the gross particles of dirt have been picked out, the wound may be cleansed by flushing it with a suitable solution and scrubbing with pieces of sterile gauze. For this purpose use freshly boiled and cooled boric-acid solution made by stirring a heaping tablespoonful of powdered boric acid into a pint of hot water, or a 1 to 5,000 bichloride of mercury solution, or a 3 per cent compound cresol solution. Be careful about disturbing blood clots in wounds because this may start bleeding afresh.

HYDROGEN PEROXIDE

The practice of applying hydrogen peroxide to fresh wounds is not recommended as a routine practice. It causes a great deal of pain, wets the wound, and is not an efficient germicide. Hydrogen peroxide may be used sometimes to check hemorrhage or to clean up an old leg ulcer, but it should not be applied to other wounds except on advice of a physician.

FIRST-AID PACKETS

Small packages properly sealed and protected containing sterile materials for dressing a wound are carried by all soldiers and are often kept on hand for emergencies in factories, on trains, etc. Various kinds of first-aid packets are on the market, and an excellent one is supplied by the American Red Cross.

TREATMENT OF CUTS

Small cuts.—Bleeding is beneficial as it serves to wash out bacteria. After hemorrhage has ceased, paint the wound and the sur-

rounding skin for a considerable distance with a light coat of iodine. Apply a dressing of sterile gauze or freshly laundered muslin and hold in place with a bandage. A sterile gauze bandage makes a convenient dressing for small injuries around the fingers or hand. A piece of the bandage may be folded into a compress, or the bandage alone simply wrapped around the finger, care being exercised so that the part which goes next to the wound is not touched by the operator.

Large cuts.—These are likely to bleed freely, but unless an artery or large vein has been opened, the hemorrhage will in most cases cease of itself.

First-aid treatment.—Send for a doctor. If the blood comes in spurts, apply a tourniquet. While waiting for the physician, make the patient comfortable and see that the clothing does not come in contact with the wound. If the patient has to be transported before medical help can be obtained, cover the wound with a number of thicknesses of sterile gauze, boiled dry muslin, or similar material. If these are unobtainable, use some freshly laundered article such as a clean handkerchief, towel, or napkin. Hold the dressing in place with a bandage.

LACERATED WOUNDS

Most of these wounds are infected with bacteria at the time the injury is received, but severe bleeding is rare.

First-aid treatment.—Check hemorrhage if necessary. Send for a doctor. Cover the wound with a sterile dressing, making no attempt to disinfect it. While awaiting the arrival of the physician, make the patient as comfortable as possible and treat shock, if it is present. If no sterile dressing is available, leave the part exposed to the air, but take care that nothing touches the wound. Treat crushes of the hand, arm, foot, or leg in the same manner.

PUNCTURED WOUNDS

Punctured wounds are especially dangerous because bacteria may be carried deeply into the tissues where conditions are very suitable for their growth. Lockjaw not infrequently develops from such injuries. Always examine the article which inflicted the injury to determine whether the end may have been broken off in the wound.

Treatment.—An effort should be made to disinfect the wound with tincture of iodine. Take a tookpick and twist a small amount of cotton around one end. Dip it in the iodine. Then push it down to the bottom of the wound and work the iodine thoroughly into the tissues. Paint the surface with tincture of iodine and apply a sterile dressing. All these patients should be taken to a doctor to have him determine whether injections of antitetanus serum are necessary to prevent lockjaw.

INFLAMED WOUNDS

Symptoms.—Sometimes after a wound has been received and dressed all goes well for a day or two and then the wound becomes painful and begins to throb. If the wound is extensive, the patient has fever, the tongue is coated, and there is considerable constitutional disturbance. In such cases a physician should be called at once. If no physician is available, the dressing should be removed and the wound inspected. The edges will probably be swollen, dry, and stuck together and there will be a diffuse redness of the skin surrounding the injury. It will be necessary to open the wound sufficiently to allow the matter which is forming within to escape. This can be done by boiling a probe, a hairpin, or some small blunt instrument, and then gently inserting it between the edges of the wound and opening them slightly. If the edges are not stuck together and fluid is escaping from the wound, do not attempt to open it any more. Wet dressings should now be applied. These should consist of from 4 to 12 layers of gauze, depending upon the size of the injury, which are wet in a freshly prepared boiled solution of boric acid.

TETANUS, OR LOCKJAW

Description.—Tetanus is a dangerous disease, due to a particular kind of germ which is introduced into the body by some sort of an injury, frequently a slight wound. The germ is often found in garden soil or street dust, coming principally from horse manure.

Symptoms.—The symptoms of tetanus are varied, but one of the most characteristic points is a stiffness of the neck and the lower jaw. Later on, spasms of other parts of the body develop. The disease is extremely fatal, the mortality ranging somewhere between 50 and 85 per cent.

Treatment.—When a person has received a lacerated wound which has been much soiled by dust or dirt, or a punctured wound from a garden implement, the most important thing is to take the patient to a doctor and have him receive injections of antitetanus serum. These injections should, in some cases, be repeated at intervals of a week, until three doses have been given.

ABRASIONS

Abrasions are very superficial wounds in which the outer layers of the skin have been rubbed or ground off by dragging the part forcibly over some rough surface.

Treatment.—If dirt has been ground into the injury it should be washed off with boric-acid solution. If the surface is clean, this is not necessary. A coat of diluted tincture of iodine, half strength or less, may be applied, but ordinarily this is not necessary, and it is

always very painful. Finally, dress with sterile gauze spread with boric-acid ointment or oxide of zinc ointment.

SPLINTERS

Small splinters may be removed from the flesh by means of a needle which has been passed once or twice through a flame and then cooled. Larger splinters may be extracted by passing a knife blade several times through a flame, cooling it, inserting the blade under the splinter and grasping the foreign body between the thumb-nail and the knife.

WOUNDS CAUSED BY FISHHOOKS

When the barbed end of a fishhook has entered the flesh, do not attempt to remove it by pulling it directly out. Such a procedure will cause great laceration and tearing of the tissues. The better plan is to depress the shank of the hook, push the point forward and onward in an upward direction, and bring it out on the surface at another point. The barbed end is then cut off with a wire cutter or file. The barbed end having been removed, the hook can be extracted by pulling on the shank without damage to the tissues.

BULLET WOUNDS

Bullets make small, deep wounds which are generally classified as punctured wounds.

First-aid treatment.—Send for a doctor. If sterile gauze is available, cover the wound with that. Remember that there may be two wounds—one where the bullet went in, the other where it came out. If only one opening is seen, search for the other on the opposite side of the limb or body. Treat shock, if present (see p. 17).

SCALP WOUNDS

Scalp wounds are common and often result from a blow on the head with a blunt object, such as a club or a bottle, the yielding scalp being caught between the rigid skull and the hard weapon.

First-aid treatment.—Check hemorrhage, if necessary, by laying a compress of sterile gauze on the wound and fastening it tightly with a bandage around the head. In severe cases a tourniquet may be tied around the forehead and head just above the ears. Send for a doctor. Treat shock, if present (see p. 17).

WOUNDS OF THE ABDOMEN

Shallow wounds of the abdomen are handled like similar injuries in other parts of the body, but deep wounds with escape of the bowels are very serious injuries and require special treatment.

First-aid treatment of wounds of the abdomen with escape of the bowels.—Send for a doctor at once. The bowels should be covered with several thicknesses of sterile gauze wet in boiled and cooled warm salt solution (a teaspoonful of salt to the quart of water). If no sterile gauze is at hand, boil a towel in a salt solution of the above strength, cool it until it is at body temperature, and then lay it over the intestines. Treat shock, which is certain to develop (see p. 17).

SNAKE BITES

Description.—The bites of copperheads, water moccasins, coral snakes, and rattlesnakes are all poisonous. The diamond black rattlesnake is the most dangerous serpent of the United States. The bite from a small snake is not as poisonous as one inflicted by a large snake of the same species. The greater number of snake bites are received on the extremities.

Symptoms.—Intense pain, discolored swelling of the bitten part, which soon becomes very marked, and profound disturbance of the system. The general symptoms develop soon after the bite. They consist of great weakness and prostration, nausea, and a profuse flow of saliva. Paralysis of the muscles occurs in from three to four hours. Unconsciousness is rare, but the patient falls into a kind of stupor.

Treatment: (1) *Instantly apply tourniquet.*—The bite is usually on the lower part of a limb, and a band made of a handkerchief, necktie, or similar article should be instantly applied a few inches above the wound between it and the heart and tightly twisted with a stick to shut off the circulation to the part and prevent the poison from being carried into the system by the circulating blood.

(2) *Incise and suck the wound.*—The bite of the most venomous serpents consists of but two punctures. These small wounds should be freely incised with a knife and then sucked. There is no danger in sucking the wound if there are no cracks or sores in the mouth or on the tongue.

(3) *Cauterize the wound.*—After the wound has been sucked, it should be cauterized. This is done by applying carbolic acid or nitric acid on the end of a stick, such as a match stick or toothpick. Most of these injuries happen in the wilds, where such chemicals can not be obtained. Cauterization may then be performed by heating a nail, a knife blade, or some other metallic object, such as a suspender buckle, in a fire and freely burning all parts of the wound. On hunting trips a cartridge may be torn open and a little gunpowder poured on the wound and then ignited with a match.

(4) *After treatment.*—After the wound has been sucked and cauterized so as to extract and destroy as much of the poison as pos-

sible, the tourniquet may be loosened. It should be allowed to remain loose for one minute and then tightened up again. Wait 20 minutes, and if no alarming symtoms develop it is again released and this time allowed to remain loose for two minutes, after which it is tightened. Another period of 20 minutes is allowed to elapse, and on this occasion the tourniquet is left off for three minutes. The procedure is continued for several hours, gradually increasing the time the tourniquet is off, and is known as using the intermittent tourniquet, the object being to allow only small quantities of the poison to get into the system at one time.

INSECT STINGS

BEE STING

The stings of bees and wasps and yellow jackets are very painful, but not dangerous to life unless the victim is attacked by a large number of the insects.

Treatment.—If the stinger remains in the flesh it should be pulled out and a drop or two of diluted ammonia water applied to the wound. A compress wet in cold water or cold boric-acid solution will help to allay pain.

STINGS OF CENTIPEDES, TARANTULAS, AND SCORPIONS

The stings of these insects are very much more severe than those of wasps or bees and may cause considerable general weakness, headache, sweating, and vomiting, but they are practically never fatal.

Treatment.—The wound should be encouraged to bleed as much as possible and afterwards cauterized with carbolic acid or some other caustic if available. Tincture of iodine may be applied. An ice compress should be placed over the wound to limit local reaction. General symptoms, such as prostration and headache, should be treated by moderate stimulation, giving aromatic spirits of ammonia, 30 drops in water, every hour, and supplementing this with half a cupful of very strong, black coffee if necessary. Some authorities recommend the application of a constricting band, which is gradually loosened in order to prevent the poison from being taken up by the system rapidly.

DOG BITES

Dog bites are usually minor lacerated wounds, but are especially dreaded on account of the danger of hydrophobia, which is almost invariably fatal.

Treatment of dog bites.—If a person is bitten by a healthy dog, the wound should be thoroughly swabbed with iodine, working the

medicine well into all parts of the wounded flesh with a small swab of cotton on a clean toothpick, and the wound treated in other respects as an ordinary lacerated wound. If the dog is sick, he should be confined and carefully watched. If he remains well for 14 days there is little danger of hydrophobia developing in the patient. In no case should the dog be killed unless it is certain he is rabid, as it will be impossible to tell whether or not he had rabies unless the head is sent to a laboratory for examination. If the dog has hydrophobia or is suspected of having hydrophobia at the time the injury is received, the wound should be thoroughly cauterized with pure nitric acid on a glass rod or the end of a match stick in the same manner as directed for the tincture of iodine. The acid should be worked thoroughly into all parts of the wound, and the point of a glass medicine dropper makes an excellent instrument for this purpose. Care should be taken not to get the acid on the sound skin. Carbolic acid, followed by alcohol, may be used for the same purpose, but is not as efficient. This cauterization should, of course, be done by a physician if one is available. After the cauterization the patient should receive the Pasteur treatment, which consists of a series of injections covering a period of some weeks.

Symptoms of hydrophobia or rabies in a dog.—It is advisable that the public should know something about the symptoms of hydrophobia in animals. A dog which is developing the disease may show hardly any symptoms except weakness. Usually, however, the animal shows a marked change in disposition, refuses his food, is apprehensive, and very restless. He is likely to run away from home, snap at anything in his way, and swallows sticks, stones, and other strange objects. Later on paralysis develops in the lower jaw. The jaw hangs down and saliva drools from the mouth. In the last stages the hind legs become paralyzed and the dog drags them. One should be especially careful about attempting to relieve a dog which apparently has some foreign object in the throat, the symptoms being that the jaw hangs down and saliva runs from the mouth. Such animals are very likely to be rabid, and if the hand is inserted into the mouth in an attempt to remove the supposed foreign body, the person may be bitten or injured accidentally by the teeth and infected with the disease. Hydrophobia usually does not develop within less than 10 days after the person is bitten, three weeks being about the average period. In rare instances the disease has appeared many months after the receipt of the injury. If the dog is suspected of being mad and has been killed after biting some one, the head should be cut off, packed in ice, and sent by express to the nearest laboratory for examination. Usually such laboratories are maintained by State health departments at the State capital.

BITES OF CATS AND OTHER SMALL ANIMALS

These injuries are usually punctured and slightly lacerated wounds. The proper treatment is the application of tincture of iodine thoroughly worked into the wound, followed by a sterile dressing.

HEMORRHAGE, OR BLEEDING

ORDINARY BLEEDING

In most wounds there is simply hemorrhage from the capillaries. The blood is red and flows steadily for a few moments, then the flow becomes slower, and finally loss of blood spontaneously ceases. Bleeding, from by far the greater majority of wounds, is of this type. Such slight hemorrhage in reality is beneficial because it serves to wash bacteria out of the tissues if any have been deposited there. If bleeding from ordinary wounds does not cease spontaneously, it can practically always be checked by placing a pad of gauze over the wound and pressing it against the wound either by the hand or a bandage, in the meantime elevating the injury if it is in the arm or leg. Many wounds are on the extremities, and this simple expedient of applying pressure and raising the part will be all that is required to control the bleeding in most cases.

Anything which makes the heart beat faster will increase hemorrhage, hence it is unwise to give stimulants to bleeding patients unless absolutely necessary to save life, and in all cases they should be kept in a recumbent or semicumbent position and as quiet as possible.

Do not put styptics, such as Monsel's solution, turpentine, cobwebs, and similar substances in wounds to stop bleeding. Bleeding can be controlled by other methods, and the use of styptics is undesirable as a general rule.

BLEEDING FROM VEINS

When a vein has been cut, the blood wells up in the wound steadily and is dark red in color, sometimes almost black. If the vein is large, the blood flows rapidly, and a considerable amount may be lost. Such hemorrhage can be stopped by simply pressing a pad of sterile gauze over the wound and then elevating the part, having the patient lie down.

PACKING WOUNDS TO STOP BLEEDING

1. In first-aid work if a doctor will arrive soon and severe bleeding of an extremity can not be stopped by elevation and the pressure of a pad on the wound, apply a tourniquet (p. 15).

2. If it is certain that medical aid can not be obtained in 4 hours, and the bleeding can not be checked by pressure and elevation of the part and becomes alarming, pack the wound.

3. Packing is also used to control hemorrhage from wounds of the trunk or neck which can not be controlled by pressure. Tourniquets, of course, can not be applied in these localities.

PREPARATION FOR PACKING A WOUND

Everything which goes into the wound should be sterile, hence it may be necessary to apply a tourniquet (p. 15) to stop the bleeding while suitable preparations for packing are being made. The tourniquet should be loosened as soon as everything is ready. The bleeding may not recur, in which case packing will not be required. If bleeding of importance starts when the tourniquet is loosened, pack the wound.

Strips of sterile gauze or iodoform gauze make excellent packing material. If these are not at hand, strips of clean muslin may be boiled for 10 minutes, the water poured off, and the strips dried as well as possible by continuing to heat them in the pan with the lid off. Be sure there is enough material to fill the wound tightly. The muslin can be boiled at the same time as the instruments but in another pan.

METHOD OF PACKING

The gauze or other prepared material is pushed firmly into the bottom of the wound with some suitable instrument, just as one would crowd tow or a piece of a rag into a crack in a boat to stop its leaking. The packing material should be torn into narrow strips and the wound gradually filled from the bottom up. Considerable pressure must be used in pushing in the material in order to make the process effective. If the wound is somewhat cone-shaped, the gauze may be packed firmly into the opening and then held in place by a bandage properly applied.

EMERGENCY PACKING

Even in camps or remote districts, pans and a fire can generally be obtained and the bleeding controlled by a temporary tourniquet while the necessary articles are being boiled. However, if it is impossible to secure sterile materials, use the cleanest thing obtainable. Strips torn from a clean handkerchief, towel, napkin, or the sleeve of a shirt can be forced into a wound with a narrow stick, a buttonhook, a long wire nail, or a pencil. It is better to run the risk of infecting a wound than to allow a man to bleed to death. Such packing, however, should be removed as soon as sterile material can be obtained and the wound repacked if bleeding starts afresh. In all cases where packing of any sort has been used, the patient should be taken to a doctor at the earliest possible moment.

BLEEDING FROM ARTERIES

Blood from arteries comes in spurts or in fine jet and is bright red.

Treatment.—Very small bleeding arteries can often be controlled by pressure and slightly larger ones by packing, but, as a general rule, if the artery is of any size and in an extremity, it will be best to apply a tourniquet immediately.

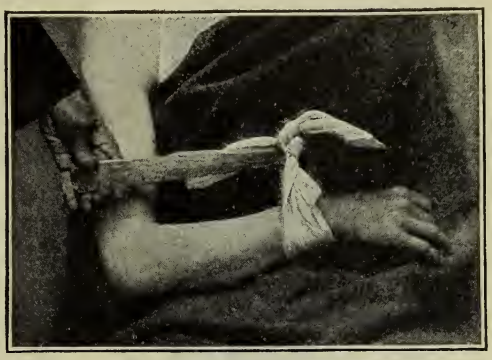


FIG. 1.—Showing how much space should be left in tying a knot for a tourniquet

TOURNIQUETS

Tourniquets are appliances used to check hemorrhage by compressing the arteries somewhere between the heart and the wound. It is well known that the flow of water through a soft tube, such as the tubing used on a fountain syringe, can be easily stopped by pinching the rubber between the fingers. Hemorrhage from a wound can be controlled in the same manner by pressing the main artery with the fingers or a pad against the bone which lies underneath or by making constriction around the limb by a very tight band.

FIG. 2.—The use of two pads to avoid bruising the flesh under the tourniquet and main artery of arm. Pair of shears used as lever to twist up tourniquet and held in position by handkerchief around the elbow

In first-aid work it may often be necessary to improvise a tourniquet. For this purpose a handkerchief, necktie, towel, or any piece of material of sufficient strength, which can be knotted around the limb and twisted up with a stick, is frequently used. These are known as inelastic tourniquets, and when using them it is advisable, when time and circumstances permit, to place a pan over the main artery so as to make pressure on it directly.

BLEEDING FROM NECK

There are many large blood vessels in the neck, and if one or more of these are severed, furious bleeding results.

First-aid treatment.—It is impossible to apply a tourniquet to the neck, as it would cause immediate suffocation. Pressure inward and backward against the backbone should be made by the thumb, placed just above the breastbone. Make the pressures slightly from the side to avoid closing the windpipe (fig. 8). If the hemorrhage is very severe, push the first available material at hand, such as a handkerchief or the end of a towel, into the wound, and hold it in place with backward pressure against the backbone. Send for a doctor at once. Have the patient sit up in a chair.

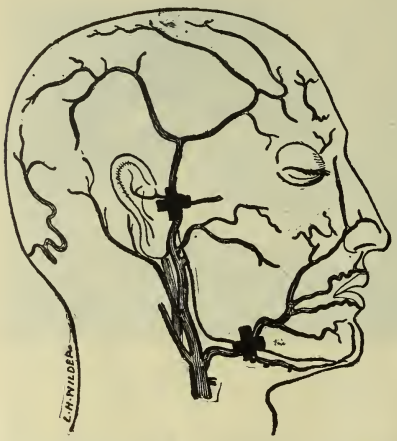


FIG. 3.—Blood supply of the face. Crosses show points for applying pressure to check hemorrhage

BLEEDING FROM THE NOSE

If it becomes necessary to check nosebleed, the patient should be placed in a semirecumbent position—that is, lying on a bed or couch with shoulders and head slightly elevated. This can be easily done by placing a tipped-over chair behind the patient. A flexible roll about 2 inches long and one-third of an inch in diameter should then be made out of newspaper or muslin and forced under the upper lip. This pad goes well up between the gum and the lip and does not rest on the teeth. It should be firmly pushed in place and should put the lip under considerable tension. The patient should remain absolutely quiet and should on no account blow the nose, as this will detach the clot and the hemorrhage will start afresh. Ice applied to the back of the neck will sometimes prove effective. If these remedies fail and the bleeding continues for a long

FIG. 4.—Point for applying pressure for checking hemorrhage from forehead

time, as a last resort it may be necessary to pack the nostril. This is done by introducing into the nose a long strip of gauze or muslin about an inch and a half wide by means of a blunt end of a penholder or a similar blunt-pointed instrument. The gauze should be packed in firmly, filling the back part of the nostril first and gradually working forward. One end of the strip should be left out of the nose in order to facilitate its removal.

FIG. 5.—Method of applying tourniquet around forehead to check severe hemorrhage from the scalp

SHOCK

After a severe accident the patient almost always goes into a peculiar mental and physical condition, which is called *shock*. This condition may immediately follow the injury or may not develop for some time.

Symptoms of shock.—The face is pale, with a dull expression. The skin is cold and covered with a clammy perspiration. The pulse is weak and rapid. It may be impossible to feel the pulse at the wrist. The patient is usually conscious, but is in a peculiar state of mental indifference, lying with the eyes partially closed and making no effort to move. He may respond to questions, but no dependence can be placed on the truth of his statements. He rarely feels pain and seems to be indifferent to his fate. The breathing is rapid, irregular, and shallow, sometimes gasping. Under suitable treatment recovery from the condition may be expected, but in severe cases shock may continue and death follow.

FIG. 6.—Point of applying pressure hemorrhage from the lips or cheek

Treatment. — The symptoms of shock give a fairly clear idea as to what the treatment should be. The body is cold, hence it should be warmly covered, the patient lying in a recumbent position with the head low. External heat should be immediately applied by means of bottles, jugs, or other containers filled with hot water. These should be placed alongside of and between the legs and around the

feet. In emergencies hot bricks or even hot stones can be used. Great care should be taken that the patient is not burnt by these appliances, however, and they should be well wrapped. The heart is weak, hence stimulants should be given. The best of these for shock is probably a small quantity of very strong, hot, black coffee. Aromatic spirits of ammonia, one-half a teaspoonful in a half tumblerful of water, is also another excellent remedy. Very small quantities of warm soup or milk are sometimes useful. Atropine sulphate in doses of 1/100 of a grain is highly recommended. Do not repeat oftener than every three hours. Liquor in shock is of questionable value. *If no other stimulants are available*, however, a moderate-sized drink of whisky may be given in warm water.

FIG. 7.—Main arteries of the neck. Crosses show points for applying pressure to check hemorrhage from neck, shoulder, or armpit

Unconscious patients can not be given stimulants by the mouth, in which case smelling salts can be held under the nose, or a few drops of ammonia water sprinkled on a handkerchief and the patient allowed to inhale the fumes at intervals a minute apart.

In case a patient who has shock is found to be bleeding freely, the first indication is to stop the hemorrhage, and this must be done regardless of his condition, as there is no hope of recovery as long as the loss of blood continues.

FIG. 8.—Point of applying pressure to check hemorrhage from the neck

BANDAGES AND BANDAGING

Bandages are generally made of muslin or gauze. There are three principal varieties of bandages in common use—the roller bandage, triangular bandage, and the many-tailed bandage.

ROLLER BANDAGE

These bandages are composed of long, narrow strips of muslin or gauze. The gauze roller bandage is the better because it has con-

siderable elasticity and is easier to fit to the part. The use of roller bandages requires some training and considerable practice. It is not difficult, however, to apply a roller bandage to the finger, wrist, or the knee joint.

METHOD OF APPLYING ROLLER BANDAGES

Having selected the proper size, hold the bandage in the right hand, place the free end of the bandage on the part and prevent it from slipping with the forefinger or thumb of the left hand. The bandage is wrapped around the limb, passing from the operator's left to right, as it goes across the front. On bandaging the trunk or upper parts of the extremities, it is necessary to pass the bandage from the right to the left hand in going behind.

FIG. 9.—Point of applying pressure to check hemorrhage from the shoulder or armpit

If the part to be covered is of the same diameter all the way up, the bandage is simply wound around the limb or body, each turn overlapping the preceding one by about two-thirds of the width. If the part increases in diameter as the bandage ascends, as, for instance, the calf of the leg, it is necessary to make a half turn or fold with the bandage at each revolution where the limb becomes larger. To do this the thumb or forefinger of the left hand is placed on the bandage in the front of the limb and the bandage given a half turn on itself, making it point in a downward direction instead of upward. This reverse is repeated at every turn until the greatest diameter of the limb is passed, when ordinary circular turns may again be resumed.

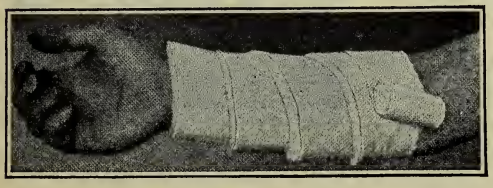


FIG. 10.—Circular bandage. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

Roller bandages should be applied firmly, but neither too tightly nor too loosely. If they are too tight, they will shut off the circulation and cause considerable pain. If they are too loose, they very quickly come off or will permit the dressing to be displaced from the wound. In using a roller bandage the ends of the fingers or toes should always be left out of the bandage, so that the operator can see if the circulation has been stopped.

THE TRIANGULAR BANDAGE

The triangular bandage has been much advocated for emergency use and for those who are inexperienced with the roller bandage. This bandage, also called the Esmarch's bandage, comes in the shape of a triangle, being about 36 inches long on the short sides and about 51 inches on the diagonal. Such a bandage makes an excellent sling and also a good tourniquet. It can be used completely to envelop a hand or foot in the case of a crushing injury. Folded up on itself so as to make a strip about 4 inches wide, it is known as the "cravat" bandage, and is useful for holding dressings in place about the head.

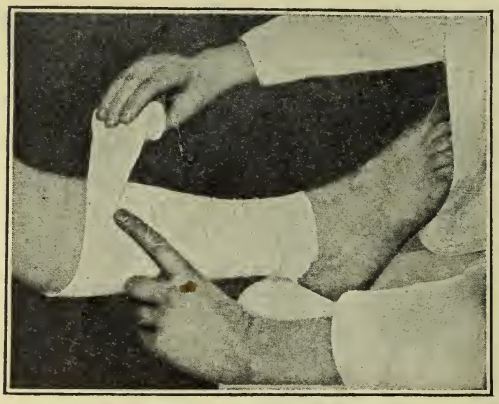


FIG. 11.—Method of making the spiral reverse bandage. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

The triangle bandage is frequently found in first-aid packets and is sometimes covered with pictures illustrating its use. However, such bandages are generally stiff and difficult to apply snugly.

THE MANY-TAILED BANDAGE

This is probably the most useful all-around bandage for first-aid work, because it can be applied by anyone who has once seen it used and can be improvised out of materials which are generally at hand. The many-tailed bandage is simply a series of strips of muslin which are tied around the limb, but instead of being entirely separated are left attached to each other at their middle. This attachment serves to hold them in place and to keep the bandage in position.

FIG. 12.—Fastening a bandage by splitting the ends

To make a many-tailed bandage, take a strip of cloth long enough to go completely around the limb and dressing and provide ends which can be tied. The ends are folded together and notched with scissors or a knife at intervals of about an inch and a half. The

cloth is torn at these points almost to the fold but not quite. The bandage is applied by laying it under the limb, straightening out the tails, and tying each tail with its fellow over the dressing in front of the limb. For neatness, the loose ends, after they are tied, may be placed under the next ends as they are fastened, thus giving the dressing a better appearance. Such a bandage can be easily loosened or tightened as occasion demands, and it can be removed and the dressing changed and the bandage used over again. It can be applied to any part of the body and holds its position well. It should be made out of muslin, old sheeting being excellent for this purpose.

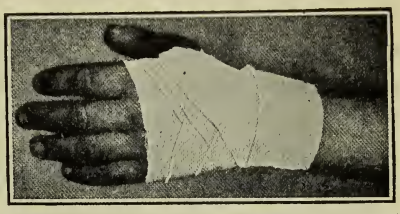


FIG. 13.—Figure of eight of the wrist and hand. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

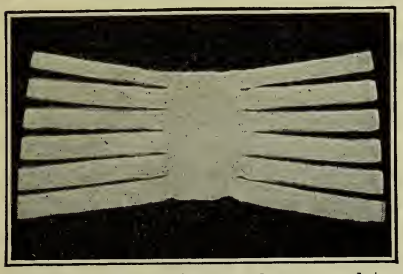


FIG. 14.—Many-tailed bandage, complete

IMPROVISED BANDAGES

There are certain parts of the body, such as the armpit, back, and groin, on which it is difficult to retain a dressing. Frequently dressings or compresses can be held in these locations very satisfactorily by pinning them fast to the shirt and then taking up the slack in the underwear by pins on the other side of the body.

A dressing can be quite satisfactorily held in place on the foot or leg by a stocking. The stocking should be rolled up and unrolled over the dressing as it ascends the leg. Pieces of stocking legs make an excellent temporary means of holding dressings on the arm also, in emergencies.

FIG. 15.—Many-tailed bandage, applied

PLASTER

Court-plaster or adhesive plaster should never be applied directly over a wound. Such plasters generally contain germs, and they seal the wound up, preventing the escape of fluid, and causing conditions

which greatly favor the multiplication and growth of bacteria. It is permissible to hold a small dressing of gauze in position over a wound by means of a strip of adhesive plaster, as, for instance, on wounds somewhere about the face, but the plaster should never touch the wound directly and there should be enough gauze under it to take up any discharges which may seep out of the injury.

In a great emergency where a physician is not available to treat a large, gaping wound it may be necessary to pull the edges of the wound together with strips of adhesive plaster. If this is done the plaster should be in narrow strips and wide intervals left between for the escape of secretions from the wound.

Before applying strips of plaster in this fashion the skin should be shaved if it is very hairy. Adhesive plaster may be removed without pain by wetting it in gasoline or ether.

MISCELLANEOUS MINOR INJURIES

BRUISE

Description.—A bruise is the injury produced by a blow with some blunt object. Bruises are received in two ways—the body may be still and the object moving, as when a boy is struck by a thrown baseball, or the body may be moving and strike against some fixed object, as when a man falls and injures himself on a hard pavement. Bruises are the commonest of all accidents, and everyone has at some time suffered from them.

Treatment.—If the injury is slight, no treatment is required. If more severe, cold-water compress should be applied. To make a cold-water compress take from 6 to 10 folds of old muslin, linen, or such material (a couple of thicknesses of Turkish toweling makes an excellent compress). The dressing should be large enough to cover the injured surface and extend a couple of inches beyond, and should be thick enough to retain the moisture for some time. It is wrung out in cold water and then laid on the seat of the injury. Some covering will be required to prevent the dressing from becoming dry, and also to protect the clothing or bed. The most available material for this purpose is oiled paper. In an emergency an old piece of oilcloth or any flexible waterproof material will do very well. This is put outside of the compress and the whole held in place by a bandage of some sort. The compress may be continued for three or four days, after which, rubbing the injured part twice a day with a mixture of equal parts of alcohol and water or undiluted whisky will help to take out the soreness.

BLACK EYE

A black eye is merely one form of a bruise. As soon as a blow is received in this region a handkerchief wrung out in ice water should be applied. The ice water should be renewed as often as it gets warm, thus combining the effect of both cold and moisture. This treatment should be kept up from half an hour to an hour and may prevent discoloration from setting in.

If treatment is begun after the flesh has become black, hot-water applications for half an hour, three times a day, will hasten the disappearance of the swelling and discoloration. The old-fashioned practice of applying raw beefsteak is not recommended. In all cases where a severe blow has been received in the region of the eye a physician should be consulted, as there is danger that injury may have been done to the eyeball.

STRAINS

Description.—Strains are the injuries produced by overstretching a muscle. The muscle, in severe cases, may be partially torn or even ruptured. The muscles of the back, shoulder, and wrists are often the seat of strains. A sudden wrench or too great exertion frequently causes this type of injury.

Symptoms.—Pain which is increased when the part is moved, soreness, and more or less swelling.

Treatment.—Rest, with gentle rubbing with alcohol and water, equal parts; tincture of arnica or soap liniment. Later on, the rubbing should be more vigorous, with gentle kneading of the muscles affected. The application of dry heat by means of hot-water bags or bags filled with hot sand will often give relief from pain and help to " limber up " the part.

FOREIGN BODIES IN THE EYE

Foreign bodies in the eye come under two classes: First, those which lodge under the lids, and second, those which are firmly adherent to the clear part of the eyeball, the cornea, sometimes known as the sight of the eye.

Treatment.—To remove a foreign body from under the lid, first of all determine which lid is affected. To do this, seat the patient on a chair facing a window and pull the lower eyelid down, having the patient look up. If a cinder or other speck is seen, take a clean pocket handkerchief, folded so that it makes a point, and remove the object with the point. Wetting the tip of the handkerchief with clean water, *not saliva*, will sometimes assist the process of removal.

If nothing is seen on the lower lid, it will be necessary to evert the upper lid. To do this take a match, lay it across the lid, holding it

in one hand, grasp the eyelashes with the fingers of the other hand, *have the patient look down*, and turn the lid upside down by pulling the lashes up over the match. The lid may be held in this position by the left hand and the foreign body removed with the handkerchief as described above. If it is very firmly embedded, a clean toothpick may be used to loosen it from the flesh.

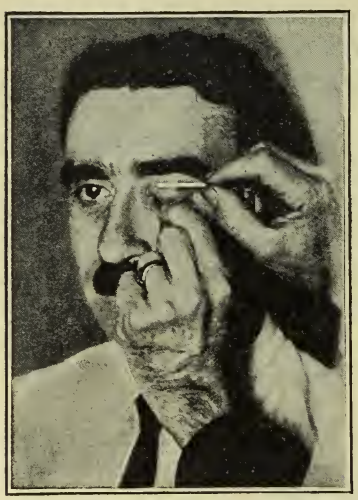


FIG. 16.—Eversion of the upper lid, step one

FOREIGN BODIES IN THE NOSE

Children occasionally slip beans and other similar objects into the nose. The bean may swell, making an effort to dislodge it particularly difficult. Sometimes these bodies may be removed by closing the other side of the nose and having the child blow the nose vigorously. Another device worthy of trial is to cause the child to sneeze by tickling the nose with a feather. Occasionally, if the object is readily seen, an attempt to remove it may be made by bending a hairpin slightly and attempting to insert the curved end alongside the object, holding the points in the fingers. These cases generally require the services of a physician, and they should always be taken to a doctor in case the simple treatment above described is not successful.

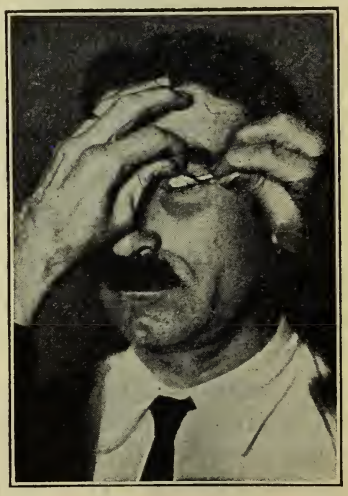


FIG. 17.—Eversion of the upper lid, step two

FOREIGN BODIES IN THE EAR

Various foreign bodies are occasionally introduced into the ears and may be the source of a great deal of discomfort and pain. An insect in the ear may be removed by turning the head to one side and filling the ear with warm sweet oil poured into it by means of a spoon. The oil will suffocate the insect and it will float out. For the removal of other objects a physician should in all cases be employed, as a great deal of harm can be done by inserting sharp instruments into

this cavity. Occasionally a small object may be removed by a gentle syringing with warm water.

FOREIGN BODIES IN THE THROAT

The beginning of the throat is known as the pharynx. Lower down there are two passages, one of which leads to the stomach, called the gullet or esophagus. The other leads to the lungs, and is known as the larynx at the upper end, lower down the windpipe or trachea. Foreign bodies may lodge in any of these passageways. Commonly such objects are articles of food, but other things which have been held in the mouth—like coins, safety pins, or marbles—may accidentally slip back and lodge in the throat. Young children are especially likely to put any small articles which they get into their hands into their mouths, and occasionally they attempt to swallow them, with disastrous results.

Foreign bodies in the pharynx.—Large foreign bodies in the pharynx cause great interference with breathing. They can generally be removed by opening the mouth and pulling the object forward by means of the fingers or by hooking the index finger behind it.

Treatment.—Place the patient on a chair facing the light, open the mouth, and hold the tongue down with the handle of a teaspoon. It may be possible in this way to see the object and to extract it. Inversion can be tried in the case of a child and the same effect produced in an adult by having him lie crosswise on a bed on his abdomen with his head and shoulders hanging over the side. Failing to remove the obstruction in this way, send for a doctor at once.

Foreign bodies in the gullet—Symptoms.—When an object lodges in the gullet the patient has pain, difficulty in swallowing, and breathing may be interfered with. Occasionally the symptoms may be slight, but more often the object produces inflammation.

Treatment.—The treatment is the same as advised for foreign bodies in the pharynx.

Note.—If a child or adult has swallowed some sharp or pointed article like a piece of broken glass or a pin, give him a diet composed largely of mashed potatoes and bread.[1] Encourage him to eat as much as possible of these articles for several days. They will surround the foreign body in large masses and prevent it from injuring the walls of the intestine. Do not give purgatives at once, but after the bread-and-potato diet has been taken for two or three days a mild laxative may be given. Watch the passages carefully for several days to be certain that the object has been passed. Such cases should always be under the care of a doctor when one is available.

[1] Swallowing broken glass is by no means as dangerous an accident as commonly believed. There is abundant proof that this material is often swallowed without any harm resulting.

Foreign bodies in the larynx—Symptoms.—When a foreign body enters the upper part of the windpipe it immediately sets up a violent attack of coughing which frequently results in its expulsion. A small article may, however, remain in the windpipe and gradually work its way lower to some point in the lung, where it remains permanently, causing a continual inflammation characterized by cough, with foul and blood-streaked expectoration. If the object is large it may completely close the passage and prevent the entrance of air to the lungs and threaten death by suffocation. In such cases a patient becomes black in the face and makes frantic struggles to secure air.

Treatment.—If the patient is a child, he should be picked up by the feet and held suspended with the head downward, which may cause the object to fall out by its own weight. Failing in this, if the symptoms are not alarming, endeavor to quiet the sufferer and send for a doctor at once.

SPRAINS

Sprains are the injuries produced by wrenching or twisting a joint. Sprains of the ankle, wrist, shoulder, and knee are very common. Severe sprains should always be treated by a doctor, if one is obtainable. There was an old saying that bad sprains were worse than fractures. As a matter of fact, many of these "sprains" were in reality small or partial fractures near the joint, especially when involving the ankle. In severe sprains of the shoulder, wrist, or ankle an X-ray examination of the affected part should always be made if it is possible to do so. Sprains of the ankle in which extensive areas of black and blue skin are observed, extending for a considerable distance up the leg, are almost always accompanied by fractures.

Symptoms.—Severe pain, always increased by motion of the joint, and hence there is often apparent lack of ability to move the limb. Swelling and sometimes redness, later on possibly discoloration.

Treatment.—Absolute rest of the joint. If at the wrist or shoulder, put the arm in a sling. If a knee or ankle is involved, put the patient in bed and lay the joint on a pillow. Apply cold water compresses, using a thick dressing large enough to wrap completely around the joint and extend well above and below it. Hot-water compresses may be used if more agreeable to the patient. Continue the compresses until the pain and swelling subside. This may require from two to five days. Then cautiously begin rubbing with alcohol diluted with an equal amount of water or tincture of arnica. Later, in addition to the rubbing, which should become gradually more vigorous, begin gently moving the joints by grasping the hand or foot and moving it in various directions. These motions should be made by the operator and not by the patient. The injured person should exercise great caution in beginning to use the part.

DISLOCATIONS

Description.—When one of the bones is forced out of its proper place in a joint and remains permanently out, the injury is known as a dislocation. These accidents tear or stretch the ligaments, and even if properly treated the joint is likely to be weak afterwards and the condition will occur more easily a second time. The shoulder joint is more frequently dislocated than any other joint in the body.

Causes.—Dislocations are usually the result of falls or severe accidents.

Symptoms.—Pain, inability to move the joint in the usual manner, the appearance of the joint differs from the sound one on the other side, the end of the displaced bone may be felt to be in an improper position when compared with its uninjured fellow, and swelling may occur shortly after the injury has been received.

First-aid treatment.—Always send for a physician if one is available. Pending his arrival apply cold water compresses to the joint and put the part at rest by placing the arm in a sling if it is in the upper extremity or by having the patient lie down and rest the injured member on a pillow if the accident has happened to the lower extremity. Under ordinary circumstances this is all that need be done until the arrival of the surgeon. It is difficult to reduce most dislocations, and considerable harm may be done by inexperienced persons in their attempts to do so.

FRACTURES

When the bone is broken and there is no wound, the injury is known as a *simple fracture.* If the skin is broken and there is a wound leading down to the ends of the bone, it is called a *compound fracture.* The student should remember that a compound fracture, then, is one in which the fracture is compounded by a wound. A *compound* fracture is *not* a fracture in which the bone is broken in more than one place without a wound. Such fractures are called *comminuted* fractures. Briefly, then, a *simple* fracture is one without a wound, a *compound* fracture is one with a wound. The distinction between these two varieties of injury is very important, because, while most simple fractures unite without difficulty or grave symptoms, compound fractures, on the other hand, on account of the open wound frequently become infected with pus germs. Active suppuration follows which involves the bone, and a long time is required for recovery. Hence, compound fractures are very serious injuries and may even at times prove fatal. Every effort should be made to prevent a simple fracture from becoming compound. As above explained, if the patient is carelessly moved, a sharp bit of bone may be easily forced through the flesh and skin, thus making a

wound and permitting the access of bacteria to the damaged tissues, which is almost certain to be followed by grave results. To prevent this accident, splints or some sort of appliances should always be placed around broken bones before the sufferer is moved.

The most important thing in handling patients with fractures, then, is to exercise the greatest care that no additional damage is done to the injured part while they are being transported to their homes or to a hospital.

In case a man has received an injury and fracture is suspected, there being great pain, more or less loss of motion, possibly numbness in the fingers or toes, it is always wiser in first-aid work to assume that there is a fracture present and treat the case accordingly until medical help is available. Splints can be improvised almost anywhere and it will do no harm to put the injured member on a splint and take the patient to a physician, even if there is actually no fracture, whereas if there is a fracture the bones may tear into the flesh and great damage result because an unprotected simple fracture may be converted into a compound one during the journey.

First-aid treatment of simple fracture.—Before taking up the treatment of fractures it is necessary to describe emergency splints.

When a fracture is suspected, lay the limb on a folded blanket, coat, pillow, or other flat, soft object while splints are being prepared.

Splints are used to prevent motion of the ends of the broken bone while the patient is being transported, and later on to hold the fragments in proper position and prevent motion while they are healing. Union can not take place if there is motion at the seat of a fracture.

Emergency splints can always be devised from some material at hand. Light boards from broken boxes make excellent splints. Two or more pieces may be nailed together in order to get one strip of sufficient length. Heavy corrugated pasteboard is frequently used, also sections of tin gutters and properly shaped strips of tin. Other articles which suggest themselves are fence pickets, laths, umbrellas, canes, rifles, and even bundles of twigs. The material selected should be sufficiently rigid to support the weight of the limb and hold it immovable.

The splints must be padded on the side which goes next to the flesh, as otherwise they are extremely painful and may seriously damage the skin. Cotton is the best material for padding, but other substances, such as waste, pieces of old cloths or quilts, excelsior and, in the woods, straw, grass, moss, etc., may be used. Special attention should be given to padding the end of the splint which will come against the body. Splints should be wide enough to give firm support—in the case of a forearm or leg, as wide as the part itself.

Emergency splints can be applied over the clothing, which will help to cushion them and protect the part.

Crepitus is a grating sensation which is felt by the manipulator when the ends of two broken bones are rubbed slightly against each other.

Applying splints.—In applying splints, great care must be exercised in moving or handling the injured limb. Both fragments of the broken bone must be supported when it is lifted or its position changed. When one splint is in place, endeavor to overcome obvious deformity and get the part into a natural position by a very gentle manipulation; then adjust the other splint and fasten both splints to the leg or arm.

Swelling very promptly follows most fractures and the limb is very painful and tender to touch. If the swelling is marked, it is customary to remove the emergency splint as soon as the patient arrives home or at the hospital and to place the limb on a pillow and apply cold-water compresses or compresses of leadwater and opium for three days.

Lead and opium wash is prepared by taking one-half of an ounce of tincture of opium and one-half of an ounce of liquor *plumbi subacetatis.* These two are mixed together and then this mixture is added to a pint of water, making the well-known leadwater and opium. This solution is much used in the treatment of bruises, sprained joints, and recent fractures where the skin is not broken. Gauze, towels, or similar material are rung out in the fluid and applied in the same manner as wet dressings. The remedy is poisonous, however, and should be kept out of the reach of children and never taken internally.

After the swelling has somewhat subsided, the permanent splints are applied. It is advisable to reduce the fracture and apply the permanent splints as soon as possible, because the longer this is postponed the more difficult it will become to get the bones into proper position.

FRACTURES OF THE FINGERS

Symptoms.—It is generally possible to obtain crepitus by gently rotating the ends of the fingers.

First-aid treatment.—All that is necessary is to place the hand in a sling pending medical attention.

After treatment.—Make a light wooden splint of cigar-box wood or similar material the width of the finger and long enough to extend from the end of the finger well into the palm. Pad and apply. Keep the splint on for three weeks, and during this period keep the hand in a sling to avoid bumps and jars.

FRACTURE OF ONE OR MORE OF THE BONES OF THE HAND

Symptoms.—Usually crepitus can be detected by carefully manipulating the suspected bone.

First-aid treatment.—Place the hand in a sling. The other bones will act as a splint if only one bone has been broken.

After treatment.—Lay the hand on a splint which extends from the ends of the fingers half way up the wrist. Pad it well and place a large ball of padding where the palm will rest. Lay the hand and forearm on the splint and place in as good a position as possible. Fasten the hand to the splints with a roller bandage or a many-tailed bandage. Then place the hand in a broad sling. Keep the splint in position for three weeks, beginning passive motion of the fingers at the end of the second week.

FRACTURE OF THE WRIST

This is very often produced by a fall on a slippery pavement, the patient striking the ground with the palm of the hand in his effort to save himself.

Symptoms.—Marked deformity and numbness of the fingers.

First-aid treatment.—No splint will be required in most cases, it being sufficient to place the arm and hand in a broad sling until a physician can be secured.

FRACTURES OF FOREARM

The arm extends from the shoulder to the elbow; the forearm from the elbow to the wrist. There are two bones in the forearm. Either one or both of these bones may be broken. When only one bone is broken the other acts as a splint and the symptoms of fracture may not be clear. In cranking an automobile, if the motor backfires, the crank will be violently whirled around in the reverse direction and frequently causes fracture of the forearm of the operator.

FRACTURE OF BOTH BONES OF THE FOREARM

Symptoms.—Pain, inability to turn palm upward and downward, possibly a grating sensation when the forearm is moved slightly. It may also be noted that the forearm bends somewhere along its course where there is no joint, indicating a break in the bones.

First-aid treatment.—Bend the forearm to a right angle with the arm. Apply two padded emergency splints extending from the elbow to the knuckle. Lay the forearm and the hand on the lower splint, gently straighten the parts as well as possible, and place the other splint on the back of the hand and arm. Fasten in place the bandage or strips of muslin and support the arm and hand in a broad sling.

FRACTURE OF THE ARM

Fractures of the arm are common, and it is sometimes difficult to get union.

Symptoms.—Pain, shortening, inability to move the arm, and sometimes crepitus and false motion may be detected. The appearance of black and blue spots on the arm after an injury in places which have not been bruised themselves should suggest the likelihood of a fracture.

First-aid treatment.—Place a broad wedge-shaped pad between the chest and the arm long enough to extend from the arm pit nearly to the elbow. The edge of the wedge goes into the armpit. This pad may be constructed of towels or even folded newspapers wrapped in some soft material. It is held in place by a band or strips going over the opposite shoulder. The pad gives a firm, straight surface to support the arm on the inside. Apply three short, narrow padded splints to arm running from the shoulder to the elbow, one on the outside, one behind, and one in front. Hold the splints in place with a many-tailed bandage or three strips of muslin. Fasten the arm to the chest with a bandage going around the rest of the body or with strips of adhesive plaster or a towel pinned in place. Place the forearm in a sling and use a narrow sling supporting the wrist only.

FRACTURE OF THE SKULL

Fracture of the skull may occur at the top or vault of the skull, or the lower part, when they are known as fractures of the base of the skull.

Fractures of the skull are serious injuries and may be due to blows, falls, or other accidents.

Fracture of the upper part of the skull can often be felt by running the finger over the scalp, the depression in the bone being easily detected. The gravity of fractures in this location depends largely on the damage done to the brain and blood vessels. If large arteries have been ruptured inside the skull the blood pours out and compresses the brain, giving rise to symptoms of brain compression.

FRACTURES OF THE BASE OF THE SKULL

Fractures of the base of the skull are generally compound, the wound not being visible, but in the nose, pharynx, or ears. They are, of course, very dangerous injuries.

Symptoms.—There may be partial or complete loss of consciousness, bleeding or the escape of blood-stained flued from the nose or ears, and paralysis of the face. Later, the symptoms of compression

may be developed, such as paralysis, slow stertorous breathing, unequal pupils, etc.

First-aid treatment.—Send for a doctor at once. Raise the head on a pillow or folded coat. Treat shock by applying hot-water bottles, jugs filled with hot water, or hot bricks around the feet and body. Be careful not to burn an unconscious patient. *Do not give whisky or other stimulants.*

FRACTURE OF THE COLLAR BONE

Fracture of the collar bone is frequently due to a fall in which the person strikes with the weight on the hand or shoulder.

Symptoms.—The patient generally supports the injured arm with the other hand. It is easy to detect a fracture of the collar bone, because the bone is placed directly under the skin and the deformity may be seen or felt. Always compare with the other side. Stand behind the patient with his clothing removed and grasp the collar bone on each side between the fingers. Make gentle motion. It will be found that the bone on the injured side can be moved and that on the other side it is rigid.

First-aid treatment.—Make a pad of towels, newspaper, or other flexible material and place in between the arm and the side in the armpit. Keep the pad in position by straps going over the opposite shoulder. Bind the arm to the side by bandages, a towel, or strips of muslin, and then make a sling which specially supports the point of the elbow so as to raise the elbow up.

FRACTURE OF THE RIBS

These injuries are often due to kicks in the side from heavy boots with the person lying on the ground. They may, however, be due to direct violence of all kinds.

Symptoms.—Pain, which is likely to be sharp and stabbing, when the patient takes a deep breath or when he coughs. It may be possible to detect unnatural motion in a broken rib by carefully running along its course from the backbone to the breastbone and making pressure.

First-aid treatment.—Wrap a strip of muslin or a towel around the chest tightly and pin it. Support with straps running over the shoulders.

BROKEN NECK OR BACK

Contrary to common belief, it is possible for a person with a broken neck or back to recover and live for many years. These injuries, however, generally severely damage the spinal cord, which is inclosed in the backbone, and more or less permanent paralysis results.

Symptoms.—Inability to move the legs. Loss of feeling in the members which are affected. If a severely injured person who is conscious can not move his legs, always suspect fracture of the back.

First-aid treatment.—The first-aid treatment of a broken back is very important, for if the injury is high up and the patient is roughly moved, the sharp edges of the broken bones may crush or compress the spinal cord to such an extent that instant death results. Therefore, if circumstances permit, do not move the patient at all pending the arrival of a doctor. If it is impossible to secure a physician, the patient should be lifted or moved only on a blanket or sheet supported at the four corners and the sides.

FRACTURES OF THE LOWER EXTREMITIES

The thigh extends from the knee to the hip and the leg from the knee to the ankle.

Symptoms.—If the ends of the bone are driven together, as they sometimes are, especially near the hip joint, the symptoms may be very slight, and it will be difficult for the inexperienced to tell whether there is a fracture or not. All fractures in the middle part of the bone will give the following symptoms:

Pain, inability to stand on the injured leg, shortening, and it will be noted that the toe on the affected side falls out. When it is placed in its natural position it again drops in a helpless manner.

First-aid treatment.—Call a doctor. Apply a long splint on the outside of the affected leg, extending from the heel to the armpit. Pad it on the side toward the body. Apply another splint on the inside of the leg, extending from the crotch to the heel. Fasten these splints by at least three strips of muslin or similar material around the body and five around the leg and thigh. These strips should be placed under the patient before the splints are applied. In lifting the thigh for this purpose have one assistant carefully support both ends of the broken bone and another the foot when the broken extremity is lifted from the ground. The leg should be carefully lifted by one person when the patient is being placed on a stretcher. Treat shock if it is present.

FRACTURE OF THE KNEE CAP

Symptoms.—The patient can not stand and is unable to raise the limb from the ground. Very often separation of the two pieces of bone may be felt by the fingers if the case is examined before swelling has set in.

Treatment.—Make a splint about 3 feet long and 4 inches wide. Pad it well and place it under the thigh and leg. Fasten it in place with a number of handkerchiefs, strips of muslin, or a bandage.

FRACTURES OF THE BONES OF THE LEG

The leg extends from the knee to the ankle joint and contains two bones. The larger bone of the leg is called the tibia. The other bone, long and slender and placed to the outer side, is called the fibula.

Either or both of the bones of the leg may be broken. If only one bone is fractured the other acts as a splint and it may be difficult to make a correct diagnosis of the injury.

FRACTURE OF BOTH BONES OF THE LEG

Symptoms.—The patient is unable to stand. There is generally deformity and false motion. Crepitus may be detected.

First-aid treatment.—Apply two well-padded splints to the sides of the legs extending from well above the knee to below the heel. Fasten in place with five strips of bandage or muslin. If a pillow is available, lay the leg on the pillow. Bring the sides of the pillow up around the leg and tie them in place with strips of muslin or bandage. A folded blanket may be used in place of a pillow. Two side splints may be now placed, without padding, on the outside of the pillow or blanket. If no other appliances are available, the injured leg may be fastened to the other leg with strips of bandages or handkerchiefs, the sound limb acting as a splint.

POTT'S FRACTURE

A fracture of the outer bone of the leg—that is, the fibula—a few inches above the ankle, is known as a Pott's fracture. It is a very common injury.

Symptoms.—The foot points outward and there is unnatural motion at the ankle joint.

First-aid treatment.—The same as described above for fracture of both bones of the leg.

FRACTURES OF THE BONES OF THE FOOT

These are usually due to direct force and are often compound.

Symptoms.—There is great pain in the foot on attempts to walk, and crepitus may be produced on gently manipulating the injured bone.

First-aid treatment.—The other bones act as splints and usually nothing will be required except to lay the foot on a pillow.

FRACTURES OF THE TOES

First-aid treatment.—A light splint may be applied to the sole of the foot, but usually no splint will be necessary.

COMPOUND FRACTURES

Compound fractures have already been described as fractures which are complicated by wound extending down to the broken bones. It is possible to break a bone and receive a wound of the skin or a wound in some other part of the limb, but if the wound does not communicate with the fracture it is not a compound fracture.

Symptoms.—The symptoms are the same as those of any other fracture, with the addition of the wound. In severe cases the end of the broken bone may come through the wound and project on the outside.

First-aid treatment.—The great aim of the treatment of compound fractures is to prevent bacteria from getting into the wound. If pus germs gain admission, there will be a great deal of swelling and inflammation and finally suppuration. The healing of the fracture will be prolonged for many weeks, and sometimes there is so much destruction of the bone by inflammatory processes that healing does not take place at all until surgical measures are employed. Therefore, in a compound fracture, always cover the wound with a sterile dressing at the earliest possible moment. After the wound has been covered, splints may be applied in the manner already described. In case a sterile dressing is not available, the wound should be allowed to remain exposed to the air while one is being prepared. A suitable dressing made of muslin or toweling may be folded into shape and boiled. After this dressing has been cooled and dried it may be placed on the wound and fastened in place; then apply the splints.

If one of these bones is sticking out through the flesh, the question arises as to whether it is wise to attempt to restore it to its natural place. If a doctor can be obtained in a short time, make no such effort, but apply the dressing over the open wound and prevent further motion of the fragments as well as may be with the splints. If the patient will have to be transported for a considerable distance before he can reach medical help, it may be proper to attempt to replace the bone by pulling on lower end of the limb in the direction of its long axis. Before doing this, in all cases, the wound and the protruding end of the bone should be thoroughly painted with tincture of iodine and all visible dirt removed from the bone, so as to lessen as much as possible the danger of dragging live bacteria into the deeper tissues. If tincture of iodine is not available, do not attempt to replace the protruding fragments.

SUNSTROKE

The term "sunstroke" denotes a sudden attack of illness from exposure or prolonged exposure to the rays of the sun; but the same

condition may be produced in hot weather by exposure to high temperature not in the direct rays of the sun, particularly if the person is engaged at hard work in close quarters. Stokers on steamships are sometimes affected by the heat of the furnace. Men debilitated from or addicted to the excessive use of stimulants are more likely to suffer than those of temperate habits.

Sunstroke occurs in two forms: Heat stroke (heat fever), in which the temperature of the body is very high, and heat prostration or heat exhaustion, in which the surface of the body is cool, sometimes considerably below normal. The difference is very important because of the different treatment required.

In severe cases of heat stroke the patient may be stricken down in a state of unconsciousness and die instantly, or within an hour or two. In other cases there may be intense headache, dizziness, marked restlessness, nausea and vomiting, and hot "burning" skin. The temperature of the patient may register 105° F. Pulse is full and may be slow or fast. Breathing is labored—may be sighing or rattling. Patient soon becomes unconscious, the stupor deepens, and death may occur within 24 hours; or the temperature may drop, consciousness may return, and the patient get well.

In heat prostration, as already stated, the surface of the body is cool, the pulse rapid and feeble, and there is a feeling of general weakness. There may be only slight faintness and nausea, and under prompt treatment patient may rapidly recover, or, on the other hand, there may be complete loss of consciousness and a rapid and fatal termination from exhaustion.

Heat cramps.—Painful spasms of the muscles, especially those of the abdomen and limbs, may occur when persons who are exposed to high temperatures are required to perform hard labor. Stokers on steamships are liable to suffer from them. They are extremely painful, making the patient cry out; there is headache, and the bowels are constipated. In some cases the patient is unconscious, and the convulsions resemble those of epilepsy. The attacks may last from 12 to 24 hours, but even after the patient becomes quiet the spasms may be renewed by a slight stimulus, such as a cold draft or a sudden movement. The muscles are sore and the patent is weak and listless for several days following the seizure. The cases vary greatly in intensity; there may be simply a slight cramp in the abdomen or in one of the muscles of an extremity.

Prevention.—The temperature and humidity of inclosed places like firerooms of ships, weaving rooms, etc., should be regulated, so as to prevent the temperature of the air from rising above 86° F. and the moisture 80 per cent. This may be accomplished by the use of fans to keep the air in motion. Cold air may be forced into these places or hot air exhausted by the same means.

Treatment.—In heat stroke (heat fever) the temperature of the body should be reduced as rapidly as possible. Place the patient in a cold-water bath, add ice, rub the body with the blocks of ice, apply ice water with ice cap to his head, and keep up the treatment until the temperature, as shown by the thermometer in the rectum, is reduced to 100° F. If the temperature rises again, repeat the treatment. If symptoms of exhaustion follow the reduction of the temperature, stimulants should be given—such as strong coffee or atropine sulphate 1/150 grain.

In heat prostration, with cool skin, weak and rapid pulse, stimulants and friction are required. Give hot coffee or 1/150 grain atropine sulphate, rub the surface of the body and the extremities, place hot-water bottles to the feet, and cover the body with blankets. If the head is hot, apply cold water to the forehead. If vomiting occurs, inject hot salt solution (one teaspoonful of salt to a pint of water) into the rectum. Apply a mustard plaster over the region of the stomach. Mustard plasters may also be applied to the feet.

EFFECTS OF HEAT AND COLD

SUNBURN

Sunburn is a red and painful condition of the skin due to exposure of the surface of the body to the rays of the sun.

Treatment.—Make a lotion as follows: Take one-half a pint of hot water and stir into it a level tablespoonful of boric-acid powder; then add 20 drops of carbolic acid, and shake well. The solution should be dabbed on the inflamed skin with a small piece of cotton or sprayed on with an atomizer. It should not be rubbed into the skin. It can be applied every half hour if necessary. If no medicine is available, cold compresses will give relief to badly burned areas.

BURNS AND SCALDS

Treatment.—Of slight or small burns or scalds.

As soon as the injury is received, plunge the part in cold water, preferably ice water. This checks the action of the heat and instantly stops the pain. If boiling water or soup is spilled over the leg or foot, do not wait to remove the clothing but thrust the entire part into a bucket of water or pour cold water freely over it. Keep submerged in cold water, or covered with a cold-water dressing, which is frequently renewed for 20 minutes to a half hour, depending upon the severity of the injury. Then apply a permanent dressing. There are many ways of treating burns, all of which have their advocates.

A very satisfactory dressing is plain vaseline or petrolatum molle. This is spread with a knife on clean pieces of old muslin, gauze, or

similar material, just as butter is spread on bread. The prepared cloth is then cut into strips and the strips are laid on the burns "buttered" side down. The plan of using several or more small strips is better than applying one large piece, as the smaller dressings come off much more easily when the burn is re-dressed. A thin layer of cotton may be applied over the muslin or gauze to protect the part from injury and the entire dressing held in place by a suitable bandage. *Never, under any circumstances, apply cotton directly to a burn.* A good deal of fluid exudes from a burn, and this fluid will harden in the cotton and cement it firmly to the surface of the wound so that it can not be removed without great pain and interference with the healing process.

Blisters may be opened by a needle, the point of which has been passed through a flame. The dressings should be removed at the end of 24 hours and fresh ones applied. Every household should keep on hand a large jar of vaseline for the purpose of dressing burns. Boric-acid ointment makes a most excellent dressing for injuries of this sort. A substitute is made by thoroughly mixing 1 part of boric acid with 10 parts of petrolatum molle or vaseline. In the absence of vaseline use sweet oil, olive oil, castor oil, or some of the many preparations of liquid petrolatum now so extensively advised for the cure of constipation. In emergencies, automobile grease or cylinder oil may be used, but always put the medicine on the dressing and then lay that on the wound rather than to attempt to spread the medicine on the surface of the burn itself. Carbolized vaseline should never be used on a burn, as the carbolic acid, if of any considerable strength, is likely to cause extensive sloughing of the part and deep ulcers, which are extremely difficult to heal. The picric-acid treatment for burns has been highly recommended and is much used, but its use should be restricted to limited burns of a rather mild degree. Some first-aid kits contain picric-acid gauze, which is first wet and then applied as a compress. Carron oil was formerly much used; it is composed of equal parts of linseed oil and limewater. It is not as good as vaseline or petrolatum molle and has the objection of soaking through the dressings and soiling the bed or clothing.

SEVERE EXTENSIVE BURNS

First-aid treatment.—These require the attention of a physician if available. Such injuries are always accompanied by shock and they should be treated by absolute quiet, covering the patient with blankets or warm clothing, applying hot-water bags and the administration of stimulants such as hot strong black coffee, half a teaspoonful of aromatic spirits of ammonia in a little water, or one large drink of whisky. It may be necessary to give one-fourth grain of morphine sulphate or some preparation of opium to allay the pain. Do not

place horse blankets next to the skin on account of the danger of lockjaw.

BURNS FROM CHEMICALS SUCH AS STRONG ACIDS OR ALKALIES

These substances, when coming in contact with the skin, frequently cause burns similar in many respects to those produced by heat. The chemical should be immediately washed off as quickly as possible with a stream of running water. It is rarely advisable to attempt to counteract the substance with some other chemical, as the proper materials for this purpose are not often at hand; and if freely flowing water is used the same effect can be produced in this manner. After prolonged washing, dress the burn by any of the methods described above, as though it had been produced by heat.

IRRITATION OF THE SKIN FROM CONTACT WITH POISON IVY

Poison ivy grows in many parts of this country along fences, walls, trees, or on the ground. The vine resembles very closely the Virginia creeper, except that it has clusters of three pointed leaves instead of five. Some people are immune to the irritating substance produced by this plant, but in others it causes a very annoying inflammation of the skin. If the hands have touched the leaves and are afterwards rubbed on the face, the poison may thus be transferred from one part to another.

Symptoms.—A red rash appears from a few hours to about a day after the patient has come in contact with the weed. This is followed by swelling and itching, and small blisters form, which may increase considerably in size. When the blisters burst, there is oozing from the surface, and later the affected areas may discharge yellow matter. The hands and wrists are the parts most commonly involved, or the feet and ankles of those who go barefooted. As above explained, the face may also be affected. In severe cases the patient may have headaches, slight fever, and feel decidedly ill.

Prevention.—It is well to remember what poison ivy looks like and to avoid it when in the woods or country. Soap is useful in counteracting the poison. Persons who know or think that they have come in contact with the plant should scrub their hands thoroughly but gently with strong soap and water.

Various writers have reported success in immunizing susceptible persons by administering gradually increasing doses of extracts made from the ivy leaves.

Treatment.—Mop the red area off with pieces of cotton wet in a strong soap solution, then apply wet compresses of a solution of boric acid made by stirring a heaping tablespoonful of powdered boric acid into a pint of hot water.

104266°—28——4

ELECTRIC BURNS

When a person comes in contact with a live electric wire, severe and deep burns are frequently produced.

Treatment.—Electric burns should be dressed for several days with wet dressings of boric acid solution, afterwards with dry gauze lightly spread with vaseline. Such burns are always very slow in healing.

FROSTBITE

Symptoms.—The local effects of cold are, according to their severity, usually divided into three degrees. In the first degree the part is painful and the skin is of a dark red hue. This condition is known as chilblain, and occurs chiefly when children or poorly nourished persons are exposed to cold. In frostbites of the second degree the skin is of a bright red or livid hue and blisters form on its surface. In the third degree the part is pale, stiff, and brittle. Severe cold causes constriction of the blood vessels, and if the blood is completely cut off for a considerable time death of the tissue results.

If heat is applied to a part that has been slightly frostbitten, a sensation of itching and tingling is experienced. In frostbites of the second degree, heat causes pain and swelling; the skin may peal off, leaving a raw surface. In the third degree, if the part is dead, no reaction takes place. The dead portion turns black, and a line of separation takes place between it and the living tissue. If heat is suddenly applied to a badly frozen part of the body the liability to gangrene (death of the tissue) is increased on account of the intense reaction that takes place in the tissue that is still living.

When the whole body is exposed to severe cold the individual becomes benumbed, exertion is difficult, and drowsiness which can not be resisted overtakes him. The eyesight fails, he totters as he walks, and then falls and becomes unconscious.

Prevention.—All parts of the body should be kept as dry as possible, as dampness increases the tendency to frostbite. The shoes should be large, and puttees or leggings should be worn loose in order not to impede the circulation of the blood. Tight garters must not be worn. It is well to wear two pairs of stockings, a woolen pair over a cotton pair. The ears and the face, except the eyes, nose, and mouth, should be well covered, especially if snow is falling or a brisk wind is blowing. Fur-lined gloves are warmer than woolen ones. Special care should be taken of the feet; they should be washed each day and a small quantity of oil should be rubbed into them. A large amount of oil does harm; only enough should be used as can be well rubbed in, leaving a dry surface when the rubbing is completed. Clean stockings should be put on each day. Wet stock-

ings should be changed for dry ones. If a person has to be on duty with wet feet, an opportunity should be afforded him to put on dry stockings at least every six hours. The feet are less likely to become frostbitten if a person keeps moving. If he has to stand in one place, shoestrings and puttees should be loosened.

Treatment.—If a physician is present, his instructions should be followed. If the frostbite is of the first degree—that is, if the tissue is only slightly frostbitten—the part should be gently rubbed, and cloths wrung out of cold water should be applied. Snow may be rubbed on the part, but it is not as efficient as cold cloths. The rubbing and the applications should alternate, rubbing a few minutes, and then applying cloths for a few minutes. The temperature of the water in which the cloths are soaked should be gradually raised until it is lukewarm. In frostbites of the second degree—that is, where the skin is of a livid hue and blisters have formed—no rubbing should be practiced, as there is danger of increasing the damage. Cold cloths should be applied, but the cold must not be kept up too long, as cold prolongs the cause of the injury. The temperature of the water should be gradually raised a degree or two every few minutes, using fresh cloths each time the temperature of the water is changed. It should be remembered that reaction takes place naturally as soon as the person is brought into the house out of the cold, even if he is treated in a cold room, and the object of treatment is to prevent this reaction from taking place too rapidly and at the same time not unduly retard the restoration of vitality. In frostbites of the third degree the same method should be followed to bring about a reaction as in those of the second degree; reaction, however, will not happen in a part that is dead, but the adjacent living tissue will react, and a red line will form between it and the dead portion.

In some cases reaction has already taken place when the person is first seen. In these cases the above treatment is unnecessary. After reaction has occurred the patient should be moved into a warm room, and an ointment composed of vaseline 1 ounce, camphor 6 grains, should be applied. The part should then be surrounded with absorbent cotton or wrapped in flannel cloths. Boracic acid ointment may be used instead of the vaseline and camphor. Blisters that form should be pricked with a needle and the water allowed to flow out, but the covering of the blisters should not be disturbed. If gangrene occurs, cloths wet with alcohol placed over the part prevent infection and hasten the separation of the dead part from the living tissue.

A person who has been exposed to a low temperature or submerged in cold water should be placed in a cold room, and artificial respiration should be performed. The extremities should be rubbed with a solution composed of equal parts of alcohol and water. When the

patient begins to react, the temperature of the room should be slowly raised, and the patient should be given hot drinks, coffee, tea, or chocolate. If the patient is unable to swallow, a pint of hot coffee or tea should be injected into the rectum. Efforts to restore animation should be continued for an hour or two, as persons have been brought to life after being apparently dead.

SUFFOCATION

It is necessary that fresh air should be constantly entering the lungs and used air expelled if life is to be maintained. When this process is stopped or markedly obstructed, suffocation results.

Most cases of suffocation are treated by removing the direct cause and performing artificial respiration. To do this properly, the operator should have some knowledge of the system.

Artificial respiration by the prone pressure method.[1]—1. Lay the patient on his belly, one arm extended directly overhead, the other arm bent at elbow and with the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing. (See. fig. 18.)

2. Kneel straddling the patient's thighs with your knees placed at such a distance from the hip bones as will allow you to assume the position shown in Figure 18.

Place the palms of the hands on the small of the back with fingers resting on the ribs, the little finger just touching the lowest rib, with the thumb and fingers in a natural position, and the tips of the fingers just out of sight. (See fig. 18.)

3. With arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the patient. The shoulder should be directly over the heel of the hand at the end of the forward swing. (See fig. 19.) Do not bend your elbows. This operation should take about two seconds.

4. Now immediately swing backward, so as to remove the pressure completely. (See fig. 20.)

5. After two seconds, swing forward again. Thus repeat deliberately twelve to fifteen times a minute the double movement of compression and release, a complete respiration in four or five seconds.

6. Continue artificial respiration without interruption until natural breathing is restored, if necessary, four hours or longer, or until a physician declares the patient is dead.

---

[1] This method has been approved by the following organizations: American Telephone & Telegraph Co.; American Red Cross; American Gas Association; Bethlehem Steel Co.; National Electric Light Association; National Safety Council; Bureau of Medicine and Surgery, Navy Department; Office of the Surgeon General, War Department; U. S. Bureau of Mines; U. S. Bureau of Standards; and U. S. Public Health Service.

FIG. 18.—Prone pressure method of artificial respiration, step one

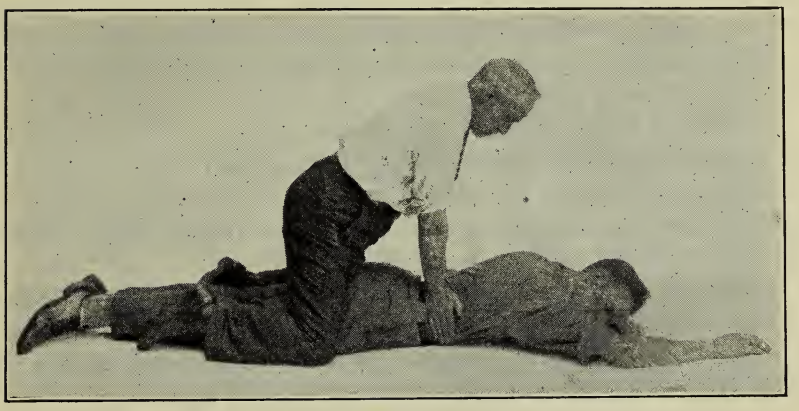


FIG. 19.—Prone pressure method of artificial respiration, step two

FIG. 20.—Prone pressure method of artificial respiration, step three

7. As soon as this artificial respiration has been started and while it is being continued, an assistant should loosen any tight clothing about the patient's neck, chest, or waist. *Keep the patient warm.* Do not give any liquids whatever by mouth until the patient is fully conscious.

8. To avoid strain on the heart when the patient revives, he should be kept lying down and not allowed to stand or sit up. If the doctor has not arrived by the time the patient has revived, he should be given some stimulant, such as one teaspoonful of aromatic spirits of ammonia in a small glass of water or a hot drink of coffee or tea, etc. The patient should be kept warm.

9. Resuscitation should be carried on at the nearest possible point to where the patient received his injuries. He should not be moved from this point until he is breathing normally of his own volition and then moved only in a lying position. Should it be necessary, due to extreme weather conditions, etc., to move the patient before he is breathing normally, resuscitation should be carried on during the time that he is being moved.

10. A brief return of natural respiration is not a certain indication for stopping the resuscitation. Not infrequently the patient, after a temporary recovery of respiration, stops breathing again. The patient must be watched and if natural breathing stops, artificial respiration should be resumed at once.

11. In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. By this procedure no confusion results at the time of change of operator, and a regular rhythm is kept up.

When the patient begins to breathe voluntarily in a regular manner, he should be turned on his back and suitable measures toward keeping him warm applied. Later on when he is conscious and can swallow, stimulants are administered such as hot black coffee or aromatic spirits of ammonia. The limbs should be vigorously rubbed toward the heart to assist in restoring the circulation and bringing up the body warmth. If vomiting occurs, turn the head to one side so that the vomited matter will run out of the mouth and not get back into the lungs. When breathing is fully established and the general condition good, the patient should be put to bed, warmly covered, and, if he is cold, external heat applied. Care should be taken to see that he has plenty of fresh air.

Various mechanical devices, such as pumps or bellows, connected with face masks or similar appliances, have been devised for the purpose of performing artificial respiration. Many of these machines have been widely advertised and highly recommended. A more extended trial, however, has demonstrated that some of them are not

entirely satisfactory and their use is occasionally followed by undesirable complications. Further developments along these lines may succeed in producing an apparatus, however, which will be free from any defects.

After natural breathing begins the patient must be carefully watched because it may fail and artificial respiration be again necessary.

In all cases of suffocation send for a doctor, if available, but do not wait for his arrival before starting artificial respiration. This should be commenced *immediately*, as a few moments' delay may mean the loss of a life. The method of performing artificial respiration is the same in all cases of suffocation.

Causes of suffocation.—These are submergence of the body in water, the breathing of certain gases, a foreign object in the throat, strangulation, and sometimes swelling of the upper air passages.

Symptoms of suffocation.—When a person for any reason is not getting sufficient fresh air the face becomes blue or almost black, the veins stand out, and he fights frantically for breath. If relief is not obtained, the efforts to secure air become more violent and the duskiness of the face increases. Convulsions may occur, but finally unconsciousness sets in, to be followed shortly by death. A person who has been apparently dead from suffocation for several minutes or longer may frequently be revived if the cause is quickly removed and artificial respiration immediately started.

DROWNING

Prevention.—Ordinary care and caution will do much to prevent accidents in the water. Inexperienced persons should not attempt to handle sailboats or even rowboats. Pleasure craft should not be overloaded nor attempts be made to change seats in small boats except with great caution.

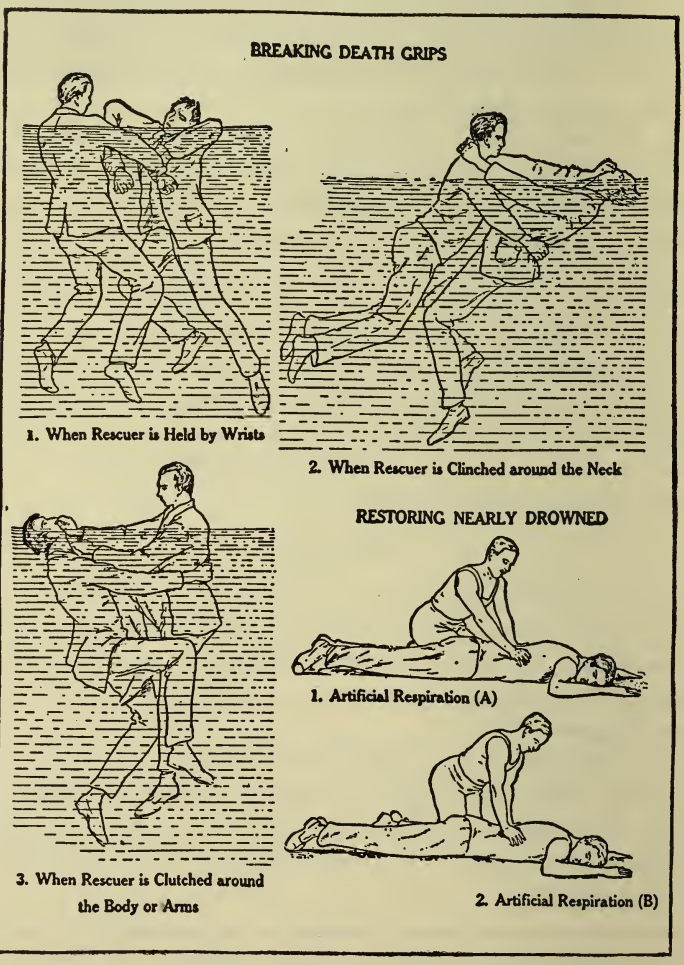
The swimmer should be careful not to overtax his strength, not to remain in the water too long, nor to get so far out that he might be caught by the undertow. Every child should be taught to swim, and all parents should appreciate the necessity of their children being given this training.

Rescue of drowning persons.—If possible, do not attempt to rescue a drowning person in deep water by entering the water yourself. The best interests of the drowning person are served, when practical, by holding out or throwing something into the water on which he can support himself till he can be pulled ashore or reached in a boat. In case a person has fallen into deep water near the shore, take an oar, a pole, a rope, or even your coat and hold it out so the drowning person may grasp it. Life preservers, boxes, boards, or logs may also be thrown into the water close to the person drowning. As has been stated above, a small, floating object is quite sufficient to sustain a person's weight in the water.

INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF

1. When you approach a person drowning in the water, assure him, with a loud and firm voice, that he is safe.

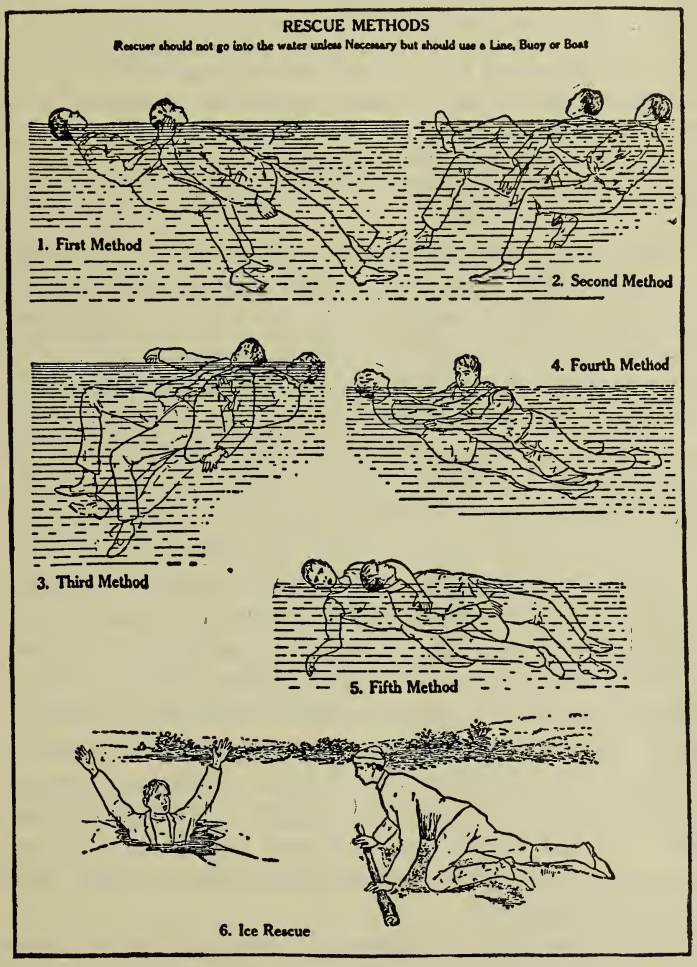
2. Before jumping in to save him, divest yourself as far and as quickly as possible of all clothes; tear them off, if necessary; but if there is not time, loose at all events the foot of long drawers, as, if you do not do so, they will fill with water and drag you.


BREAKING DEATH GRIPS
1. When Rescuer is Held by Wrists
2. When Rescuer is Clinched around the Neck
3. When Rescuer is Clutched around the Body or Arms
RESTORING NEARLY DROWNED
1. Artificial Respiration (A)
2. Artificial Respiration (B)

3. On swimming to a person in the sea, if he be struggling, do not seize him then, but keep off for a few seconds till he gets quiet, for it is sheer madness to take hold of a man when he is struggling in the water; and if you do, you run a great risk.

4. Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible onto his back, give him a sudden pull, and this will cause him to float, then throw yourself on your back also and swim for the shore,

having hold of his hair, you on your back and he also on his, and, of course, his back to your stomach. This is the safest way and you will get sooner ashore than by any other means, and you can easily thus swim with two or three persons. One great advantage of this method is that it enables you to keep your head up, and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair and throw both the person and yourself on your backs. After many experiments, it is usually found preferable


RESCUE METHODS
Rescuer should not go into the water unless Necessary but should use a Line, Buoy or Boat
1. First Method
2. Second Method
3. Third Method
4. Fourth Method
5. Fifth Method
6. Ice Rescue

to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

5. It is believed there is no such thing as a death grasp; at least it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose his senses, he gradually slackens his hold until he quits it altogether. No apprehension need, therefore, be felt on that score when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air bubbles, which will occa-

sionally rise to the surface, allowance being, of course, made for the motion of the water if in a tideway or stream which will have carried the bubbles out of a perpendicular course in rising to the surface. Oftentimes a body may be regained from the bottom before too late for recovery by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom, the hair of the head should be seized by one hand only and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try to get to land. If there be a strong "outsetting" tide, and you are swimming either by yourself or having hold of a person who can not swim, then get on your back and float till help comes. Many a man exhausts himself by attempting to swim for the shore on a back-going tide and sinks in the effort, when, if he had floated, a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

The popular idea that a drowning person rises to the surface three times is apparently incorrect. Some persons never come to the surface at all. Others come up but once, so no assumption should be made that the rule of coming up three times will always hold true.

When a person has been brought to land or other safe place, if he is unconscious, the first procedure is to get the water out of the lungs. To do this roll him on his face, stand astride of the hips, and clasp the hands under the lower part of the abdomen. Lift up the hips and abdomen by straightening the back. This will cause the head to be lower than the lungs and the water will run out of the mouth. Hold in this position for a few moments, or as long as the water runs out of the mouth, giving the body several slight shakes. Then sweep the finger into the mouth to see that the throat is not clogged with sand, seaweed, or other matter, remove tight clothing from around the neck or throat and begin artificial respiration immediately. It is not necessary to roll an apparently drowned person over a barrel to get the water out of him. Attempts at resuscitation on a beach should not be made with a part of the body submerged in the water or in such a position that a wave may sweep over the unconscious person. It is better to drag him well up where he will be dry and out of danger.

Artificial respiration on apparently drowning persons should be carried out as directed above. As soon as the person is revived and the breathing is satisfactory he should be taken to some warm place, the extremities rubbed, and suitable general remedies administered.

ELECTRIC SHOCK

Many of the wires strung about city streets carry powerful electric currents. If such wires become broken or sag down, passers-by may come in contact with them and receive severe and possibly death-dealing shocks.

Prevention.—Broken wires of any sort dangling from their poles should not be touched. They may carry dangerous currents themselves or be temporarily charged because they are somewhere resting on live wires.

Symptoms.—In severe electric shock there is sudden loss of consciousness, the breathing is likely to be entirely arrested, and the pulse weak. Burns may be caused by the arcing of the current where the wire has touched the body.

Treatment.—The first thing to be done is to break the contact of the person with the wire, third rail, or other source of the current; great care must be exercised in doing this or the helper may be as badly injured as the original victim. The body of a person lying upon a conductor is fully charged with the electricity, and it is dangerous to touch it with bare hands unless the body of the assistant is thoroughly insulated. The coat, however, may be grasped, and possibly the injured person can be dragged from the wire in this manner without actually touching the flesh. If absolutely necessary to take hold of the body, wrap the hands in several thicknesses of dry cloth, rubber sheeting, or dry newspapers, and stand on a dry board or other nonconductor if possible.

A live wire may be removed from an unconscious person by lifting it off with a dry pole, wooden walking stick, or some similar article made of wood, which is a nonconductor. The wood must be dry, however. The person endeavoring to perform the rescue should in all cases stand on a dry board if it is obtainable. A number of newspapers, or the operator's folded coat, will answer the same purpose in an emergency. Rubber overshoes and heavy rubber gloves furnish good protection. If the power house is near or there is a switch in the locality, it may be better to attempt to have the current turned off rather than to try other procedures. If the live wire is so twisted around the body that it is necessary to cut it, use an ax or hatchet with a wooden handle. Be careful that the cut end does not strike the operator.

When a wire is taken off the body or a person is removed from the wire, this should be done with one motion if possible, because if the wire touches the person several times burns will be received at each contact.

After the person has been removed from the current, if he is not breathing, artificial respiration should be immediately performed followed by the usual restorative measures as described before.

GAS POISONING

Gas poisoning is a frequent accident, especially in the larger cities and towns where gas is used for illumination purposes. Various

gases may be detrimental when inhaled for a considerable period, the amount of injury depending upon the nature of the substance; and even apparently innocuous gases, such as carbon dioxide, may cause death, not by their direct action but by depriving the patient of air because they have replaced it, and the patient is not getting oxygen. Gases like ammonia or chlorine may quickly produce death from shock and irritation. Many deaths have been reported from the gas generated by an automobile engine running in a small garage which was tightly closed on a cold morning. The use of poisonous and irritating gases in warfare was developed to a great degree in the World War.

Firemen are frequently overcome from the effects of smoke and the products of combustion from wood, varnish, and other materials in burning buildings.

By far the greater number of cases of suffocation due to gas in this country are caused by illuminating gas. Many persons use this method of committing suicide.

Prevention.—A gas burner should never be turned down low and allowed to burn all night in a room in which persons are sleeping, as the flame may be extinguished by a change in pressure or a slight draft and later the room become filled with gas. When going into burning buildings which are filled with smoke it is well to tie a cloth wet with water around the nose and mouth. As the air is generally purer near the floor than at the ceiling, the person should, if necessary, walk on the hands and knees or crawl on the floor. In entering a room or other place which is full of gas to remove a suffocated person take several deep breaths of pure air outside and spend as brief a time in the compartment as possible.

Symptoms of illuminating-gas suffocation.—Preliminary signs are headache, dizziness, nausea, feeling of sleepiness and languor, and a rapid pulse. In later stages when unconsciousness comes on, the face and hands are blue, heart action is very rapid and weak, and breathing may be shallow or entirely suspended.

Treatment.—The patient should always be immediately removed to where the air is fresh and good. If he is only slightly affected, walk him up and down in the open air and give some effervescing drink, such as soda water, beer, or a teaspoonful of baking soda in a glass of water. This will cause belching of the gas and relief from nausea.

In more severe cases, when the patient is more or less unconscious but still breathing, sprinkle a few drops of ammonia water on a handkerchief and allow the patient to take one breath with this under his nose, once a minute. Rub the arms and legs briskly toward the heart to promote the circulation. If the patient is

conscious enough to swallow, give one-half teaspoonful of aromatic spirits of ammonia in half a glass of water.

If breathing has ceased, begin artificial respiration at once, after loosening the collar or any tight clothing around the neck and chest. Have an assistant give whiffs of ammonia, as described above, and also rub the extremities toward the heart; but do not let these procedures interfere with the artificial respiration, which must be continued without interruption until the patient begins to breathe of his own accord in a regular manner.

The after treatment is rest in bed with appropriate stimulation. In severe cases the patient should be kept in bed until he has fully recovered, as dangerous symptoms have followed getting up too early.

UNCONSCIOUSNESS

Description.—A person is unconscious when he does not realize what is going on around him. Unconsciousness may be complete or partial. In the latter case the individual can be aroused, but is not fully in the possession of his senses.

Causes of unconsciousness.—All forms of unsconsciousness are due to some sort of a disturbance of the brain. The causes which act on the brain and produce this condition are many and varied. A blow on the head or pressure on the brain from a large blood clot or a depressed fracture of the skull may cause unconsciousness. A lack of blood supply to the brain produces the same condition as in fainting. Certain drugs, like opium, ether, chloroform, or large amounts of alcohol when circulating in the blood affect the brain and are followed by loss of consciousness. Such substances may be absorbed from the stomach or inhaled and taken up by the lungs. The system itself may produce poisons which are not gotten rid of and unconsciousness follows. This frequently occurs before death from diabetes. Finally, unconsciousness may be a symptom indicating a disease of the nervous system, such as epilepsy.

An unconscious person is absolutely helpless and especially dependent on his friends or whoever happens to be near for aid and protection from harm. However, a word of warning concerning the handling of unknown unconscious individuals in public places may not be amiss. It is not wise to follow a perfectly natural impulse to search the clothing or to look through the pocketbook of an unconscious person to ascertain his name and address. Such an act may be interpreted by the bystanders as an attempt at robbery, and unpleasant complications result. These measures should be left to the police or other persons of recognized authority.

GENERAL RULES FOR THE EXAMINATION OF UNCONSCIOUS PERSONS

1. Feel the pulse at the wrist and form an estimate of its rate and force. A rapid, weak pulse indicates a dangerous condition. A strong pulse, beating between 76 and 90 per minute, is a good sign.

2. Determine whether the person is breathing or not and the nature of the respirations—whether they are slow or fast, deep or shallow.

3. Note the color of the face.

4. Observe whether the skin is hot or cold and the presence or absence of perspiration.

5. Examine the eyes to see whether the pupils or blacks spots in the middle of the eye are small or large. Compare the two eyes to see whether the pupils are of the same size.

6. If the person has evidently been the victim of an accident, look for hemorrhage and feel the head to detect possible fractures of the skull.

7. Take into consideration the surroundings and other general conditions. When the heat is excessive, heat strokes are a common cause of unconciousness. An empty bottle near by may suggest attempted suicide by poisoning. Signs of a struggle might indicate an assault, with brain injury.

FAINTING

Fainting is a temporary loss of consciousness due to insufficient supply of blood to the brain.

Some persons faint very much more easily than others. The tendency toward fainting does not always depend upon the physical strength, and strong men sometimes faint from very slight causes.

Persons may faint from exhaustion, weakness, hemorrhage, extreme heat, lack of air, or some emotional shock, such as fear or the sight of blood. There is a very important mental element in almost all fainting attacks.

Symptoms.—A feeling of weakness comes over the patient and black spots float before the eyes. The face becomes pale or greenish yellow, and the lips lose their natural color. Cold perspiration breaks out on the forehead. There is a tendency to yawn; the pulse is rapid and weak and the respirations are very shallow. Finally, the patient sinks back in his seat or falls to the ground unconscious.

Treatment.—When the beginning of the attack is felt or noticed, it may be possible to check it by lowering the head between the knees. If in spite of this the symptoms continue, immediately place the patient in a recumbent position and lower the head. When a couch or bench is available, lay the person on it with the head hanging

over the end or side. The color of the face is a good indicator of the blood supply of the brain. A pale face indicates a lack of blood in the brain. Lowering the head causes the blood to go to the brain by gravity. As a general rule in all accidents, if the face is pale, lower the head. If the face is red, raise the head on a pillow or coat.

It is important that the fainting person should have plenty of fresh, cool air. This alone will often bring about recovery. Dashing cold water on the face or chest is useful. Smelling salts or a few drops of ammonia water on a handkerchief held under the nose at intervals of a minute apart, until the patient has taken one breath, and fanning the face, will assist in recovery, but ordinarily all that is required is a recumbent position with the head low. When the patient becomes conscious, give one-half a teaspoonful of aromatic spirits of ammonia in water if available. Do not permit the person to get up or attempt to walk until he or she is fully recovered.

FITS

Fits are a symptom of a disease called epilepsy in which the patient goes into a more or less violent convulsion with gnashing of the teeth and frothing at the mouth and then falls unconscious. These attacks may occur at rare intervals or as frequently as several times a day. The attacks differ greatly in their severity as well as their frequency.

The period of unconsciousness may be only momentary or may continue for several hours. The patient is likely to bite his tongue during the convulsion or to fall and injure himself by striking some hard object.

Treatment of the convulsion.—Do not attempt to prevent the movements or to break the grip as the fit can not be checked in this way. Lower the patient to the ground or floor and simply protect him from harm by gentle restraint and guard against biting the tongue by inserting a piece of wood or a wad of paper between the teeth and holding it in place.

No effort should be made to arouse the person from the period of unconsciousness which follows, but he should be warmly covered and placed in a safe place and allowed to sleep until he awakens naturally.

In examining unconscious person in which a fit is suspected always look at the tongue and also the forehead and face. If the tongue is badly scarred, or if there are many old scars around the forehead, it is strongly presumptive that the person has epilepsy. In the unconsciousness following an epileptic attack the pulse is good, the breathing is regular, the face is slightly pale, and the pupils are equal.

BRAIN INJURIES

Concussion.—By concussion is meant a shocking or jarring of the brain substances such as follows a blow on the head.

Symptoms.—The symptoms are dizziness, nausea, and more or less loss of consciousness, depending upon the severity of the injury.

Treatment.—Place the person in a recumbent position, with the head slightly raised, and allow him to react. Stimulate by placing a few drops of ammonia water on a handkerchief and every minute hold it under the nose until the patient has taken one breath. Too much ammonia is very irritating, hence the patient should be given only an occasional whiff of the gas. When he can swallow, administer one-half teaspoonful of aromatic spirits of ammonia in a little water.

APOPLEXY

Apoplexy, or a stroke as it is sometimes called, is due to the spontaneous rupture of a blood vessel in the brain and the resulting hemorrhage into the brain substance. Apoplexy generally occurs in elderly individuals, especially those who are of the type known as full-blooded. Reference is often made to hardening of the arteries, which is a frequent cause of apoplexy. In certain persons the arteries lose their elasticity and actually become hard. The artery at the wrist may be felt through the skin, somewhat resembling a hard cord or a pipestem. When a general hardening of the arteries takes place throughout the body the blood pressure rises and the arteries are weaker than normal. The arteries in the brain are not supported by the surrounding tissues, hence rupture of a vessel is more likely to take place here than in other parts of the body.

Symptoms.—These are practically the same as those of compression. The patient suddenly or gradually becomes unconscious. The pulse is generally weak and rapid, but may at first be unusually slow and strong. The breathing is slow, the patient snores, and the lips and cheeks puff out at every expiration. The mouth is drawn to one side and the patient, if he endeavors to talk, talks out of that side. The face is red and the skin warm. The pupils are unequal. If the patient is unconscious he can not be aroused. There is usually paralysis of one side of the body.

Wounds of the brain.—Severe head injuries may be accompanied with actual wounds of the brain or escape of the brain substance.

Symptoms.—These are varied, depending upon the location of the injury and the amount of damage done, but generally resemble either severe concussion, compression, or both.

Treatment.—First-aid treatment of compression of the brain, brain injury, and apoplexy is the same. Raise the head on a pillow, give plenty of fresh air. Send immediately for medical help. Pending the arrival of the doctor, cold cloths may be laid on the head if there is no wound of that region. *Do not in any case give alcoholic stimulants.*

POISONING

GENERAL COMMENTS

The symptoms of poisoning depend upon what poison has been taken. Many poisons produce nausea, vomiting, purging, and collapse. Others bring on convulsions or spasms, and a few cause the patient to become gradually unconscious without any other striking symptoms.

In endeavoring to determine what poison has been taken, if no information can be obtained from the patient, an examination of the surroundings may throw light on the case. An empty bottle may be discovered in the vicinity or some of the substance may have been spilled over the floor or clothing which can be smelled and otherwise examined. It may be ascertained that certain poisons were in the house, and one of the containers may show signs of having been recently opened or handled. Always smell the breath and examine the mouth. The mouth may be stained or burned by certain chemicals in a characteristic way, such as follows drinking carbolic acid or other strong acids.

If the patient has taken a drug accidentally he will, of course, be willing to tell what it was, if he is conscious.

A skilled physician is often able to decide from the symptoms what poison has been taken, but this can not be expected of a layman. Always send immediately for a doctor if poisoning is suspected, but pending his arrival certain first-aid measures may be undertaken.

General treatment of all poisoning.—In the absence of a direct knowledge as to just what to do, the following line of procedure is recommended:

First: Give the antidote if it is known and available. Lacking the proper antidote, white of eggs, milk, or strong tea may be administered, as they will do no harm and are somewhat antagonistic to a number of common poisons.

Second: Get the poison out of the stomach as promptly as possible.

After the antidote has been administered, the stomach should be emptied as quickly as possible. The antidote is expected to combine with the poison and render it harmless, but it may not be effective, or the resulting mixture may be harmful if afterwards absorbed. To cause vomiting, tickle the back of the throat with the forefinger or give an emetic.

Emetics.—Emetics are substances which produce vomiting. The ones most available are luke-warm water mixed with mustard or common salt. A heaping teaspoonful of mustard or salt to a cupful of luke-warm water—stir it and have the patient drink the mixture.

Repeat the dose every 10 minutes until 3 or 4 tumblerfuls have been swallowed if vomiting does not occur sooner. It is well to cause the patient to vomit several times and to have him drink freely of lukewarm water in the intervals. This process assists in washing out the stomach. One or two teaspoonfuls of sirup of ipecac or wine of ipecac are good emetics. Such preparations of ipecac are often kept in the home to administer to children with croup.

There are a few poisons in which it is not wise to give an emetic, but in an emergency, in the absence of a doctor and specific knowledge to the contrary, the general rule for giving an emetic holds.

THIRD: After giving the emetic and producing vomiting, the various symptoms which arise should be treated according to the nature of the case.

If the pulse becomes rapid and weak, hot coffee, one-half teaspoonful of aromatic spirits of ammonia, or small doses of whisky or brandy should be given. If the patient is greatly weakened and prostrated, as he generally will be, hot-water bottles should be applied around the feet and extremities and measures taken to sustain the general strength.

WARNING: Poisons, such as carbolic acid or antiseptic tablets, should not be kept on the same shelf with harmless remedies. Such drugs should be kept in a separate place or in a special box and well out of the reach of children. Poisonous solutions should never be left in drinking glasses, as children or even adults may drink them without the knowledge of their dangerous character.

SPECIAL POISONS

The treatment of a few of the commoner poisons will be described briefly.

CARBOLIC ACID

Symptoms.—These come on very quickly. There is violent vomiting and purging, with pain in the stomach. The skin is drenched with sweat, the pulse is weak and rapid, and the patient goes into a state of extreme prostration. The burns produced in the mouth by the pure acid are white areas surrounded by red edges. The crude acid produces black marks on the lips and in the mouth. The burns in the mouth and the odor of the drug will often enable one to decide what has been taken.

Treatment.—Give a heaping tablespoonful of Epsom salts dissolved in water. Wash the mouth out with whisky, brandy, gin, or alcohol and water, equal parts. After the rinsing have the patient swallow three or four tablespoonfuls of any of the above liquors diluted in water (adult doses). Alcohol is not an antidote, but checks the caustic action of the acid.

If the patient is not vomiting, give an emetic to free the stomach of what may be taken up by the alcohol. Put the person in bed. Give general stimulants, such as hot coffee, and apply external heat by hot-water bottles.

BICHLORIDE OF MERCURY OR CORROSIVE SUBLIMATE

This substance is most used as a germicide and is frequently kept in houses for making solutions for washing wounds, etc. It is generally made into tablets with some coloring matter, red or green, and these tablets are commonly called antiseptic tablets. Bichloride of mercury is an extremely powerful poison, and many deaths, both accidental and suicidal, have been recently reported from taking this substance.

Symptoms.—A strong metallic taste in the mouth, intense pain in the stomach, with vomiting and free purging. Later extreme weakness and collapse. If the patient is tided over the acute symptoms, death may follow several days later from kidney failure.

Treatment.—The antidote is raw white of egg, which should be immediately given. Use two or more eggs. If eggs are not at hand, finely chopped lean raw meat mixed with water or milk may be administered. Strong tea is also useful. It has been suggested that a man alone in the woods who accidentally swallowed a bichloride tablet might open one of his own veins and suck his own blood, as the albumen of the blood will form an antidote. After giving any of the above, excite vomiting by emetics. The albumen of the egg or meat unites with the mercury but will afterwards be absorbed, hence it is necessary to remove it. Put the patient in bed. Give more white of egg, barley water, or thin cooked starch, and apply external heat by water bottles. Give stimulants, such as hot coffee, if necessary.

Recently a number of chemical antidotes, which it was believed would neutralize the poison which had been absorbed into the system, have been proposed. None of these, however, have apparently stood the test of animal experimentation satisfactorily.

OPIUM, LAUDANUM, MORPHINE, AND HEROIN

These are all alike in their action and produce similar symptoms and are treated in the same way.

Symptoms.—At first drowsiness, later followed by complete unconsciousness. The pulse is at first slow and strong, later weak and rapid. The respirations are very slow. The patient may breathe only six times a minute. The face is red and dusky. The skin is warm and the pupils are contracted.

Treatment.—Give strong tea or permanganate of potassium, one-third of a teaspoonful dissolved in a pint of water. Then endeavor to induce vomiting by the finger in the throat or emetics. A cupful of very strong black coffee may be injected into the rectum by means of a fountain syringe. If conscious, give strong black coffee by the mouth. It is essential to keep the patient awake. This can be done by forcing him to walk, supported by two assistants. Tickling in the ribs is also helpful, producing the same result. Inhalations of ammonia, strong coffee, $\frac{1}{100}$ of a grain of atrophine sulphate, or $\frac{1}{30}$ of a grain of strychnine sulphate will assist in maintaining the heart. It may be necessary to use forceful measures to keep the patient awake for a number of hours. As long as the patient is awake he will continue to breathe, but if he is permitted to sleep, breathing is likely to stop. If breathing fails, use artificial respiration.

STRONG ACIDS, SUCH AS MURIATIC ACID, NITRIC ACID, OR SULPHURIC ACID

These acids are frequently used in shops and factories for various commercial purposes and they may be accidentally swallowed.

Symptoms.—Pain in the stomach, intense thirst, difficulty in swallowing, feeble pulse, clammy skin, difficult respiration, and, in severe cases, collapse.

Treatment.—Give no emetic. Give as an antidote large drinks of water and chalk, magnesia, or baking soda. Plaster from the wall may be given in an emergency. Olive oil, raw whites of eggs, and thin starch are useful. After treatment consists of rest in bed, appropriate stimulants, and external heat.

LYE, AMMONIA WATER, OR OTHER STRONG ALKALIES

Symptoms.—Intense pain in the stomach, nausea, and vomiting. Later followed in severe cases by collapse.

Treatment.—Give diluted vinegar, lemon juice, or orange juice, or whites of eggs in water. It is not wise to give an emetic, and patient will generally vomit without. The irritant effects of the poison should be overcome by administering olive oil, milk, barley water, or flaxseed tea. Put the patient in bed and give general stimulants if needed. Keep up the body heat, applying hot-water bottles to the extremities.

TINCTURE OF IODINE

Tincture of iodine is a common household remedy, but is poisonous internally and may be accidentally swallowed.

Symptoms.—Pain in the throat and stomach, vomiting and purging, the face is pale, and the pulse weak and rapid.

Treatment.—Give boiled starch or flour paste or mashed potatoes as an antitdote. Empty the stomach by emetics. Administer stimulants such as hot coffee or one-half a teaspoonful of aromatic spirits of ammonia every hour. Apply external heat by hot-water bottles. Afterwards give soothing and mucilaginous drinks, such as flaxseed tea, barley water, or tapioca gruel.

ARSENIC

The various salts of arsenic, such as Paris green and others, are frequently used in sprays for trees or vegetables, for preserving skins, as the active agent in fly papers, and sometimes as poison for small animals.

Symptoms of arsenical poison.—These come on about an hour after substance has been taken and resemble in many respects acute cholera morbus. There is pain in the abdomen and a feeling of constriction in the throat, accompanied with severe vomiting and profuse diarrhea. Later the stools are very thin, containing a few flakes of mucous and often streaked with blood. Finally great general weakness comes on, with shallow breathing and a very rapid and weak pulse. If the patient lives until the third day the symptoms may become very much milder at that time, only to be followed subsequently by a relapse, generally ending in death.

First-aid treatment.—The chemical antidote is prepared by stirring a teaspoonful of magnesia into a cup of water, adding 2 tablespoonfuls of tincture of iron, stirring well, and then giving the entire mixture as one dose. If magnesia is not available, ammonia water or aromatic spirits of ammonia may be added to any solution which contains iron, such as tincture of iron, the resulting precipitate collected by filtering it through several thicknesses of cloth placed in a funnel and then washing the precipitate by pouring clean water on the cloth until the smell of ammonia has disappeared. About 2 tablespoonfuls of this soft gelatinous mass should be mixed with water and administered by the mouth. The stomach should be emptied by emetics after the antidote has been given, or before if the antidote is not available. Magnesia alone is useful as an antidote in tablespoonful doses mixed with water.

After administering the antidote and producing vomiting, give soothing gruels such as flaxseed tea, thin cooked starch, tapioca gruel, and later two tablespoonfuls of castor oil to empty the bowels.

The general strength should be supported by artificial heat, plenty of bedcovers, and small doses of strong coffee. Pain in the stomach may be allayed by a hot-water bottle and doses of opiates, such as 10 drops of tincture of opium or a sixth of a grain of morphine sulphate.

STRYCHNINE

Strychnine is often used as a poison for wolves, squirrels, and small animals and may, of course, also be kept in the house as a medicine.

Symptoms of strychnine poisoning.—These come on either suddenly or gradually. The patient, without warning, goes into convulsions or stiffness of the neck; a feeling of apprehension and muscular twitching may occur before the convulsions develop. The convulsions are very severe, and the body is often arched over backward like a bow, the patient resting only on the head and heels while attacked. The sufferer is conscious, greatly alarmed, and the corners of the mouth are drawn up, producing a sarcastic smile.

First-aid treatment.—Give several cups of strong tea as the chemical antidote and then excite vomiting by any of the previously mentioned emetics. After causing vomiting several times and washing out the stomach as thoroughly as possible in this way, give 40 grains of potassium bromide and 10 grains of chloral. This dose may be repeated at the end of two hours. If the convulsions prevent the administration of the medicine by mouth, it may be possible to give it by the rectum in the shape of a small injection. The patient should be kept in a dark room and very quiet, as any sort of stimulation may bring on the convulsions. Artificial respiration will sometimes be necessary.

PTOMAINE POISONING

Certain kinds of bacteria when they grow in some foods, especially fish, shellfish, and mixtures of eggs with cream or milk, produce highly poisonous compounds called ptomaines. The eating of such contaminated food is followed by ptomaine poisoning. The formation of the ptomaines in food is favored by warm weather and long keeping.

Symptoms.—Headache, pain in the muscles, nausea, thirst, intense pain in the stomach, vomiting, and purging. The patient rapidly grows very weak and in severe cases goes into collapse. The symptoms may come on immediately after the food has been eaten or may not appear for some hours.

Treatment.—If vomiting has not occurred, give an emetic. Also administer a rectal injection of a pint of soapsuds to empty the bowel quickly. Follow the emetic in half an hour with a large dose of castor oil. Keep the patient in bed, administer stimulants if necessary, such as small doses of strong coffee or a tablespoonful of whisky every two hours. Surround the extremities with hot-water bottles. Keep the patient warm.

Vomiting can be held in check by small drinks of plain soda water or ginger ale, if available. No food should be allowed until the acute symptoms have subsided, and then only a liquid diet in small quantities at first.

A characteristic feature of true ptomaine poisoning is that the patient remains weak for a long period and that recovery is very slow, oftentimes requiring several weeks.

MUSHROOM POISONING

Certain varieties of mushrooms are highly poisonous, and if eaten produce severe illness and often death. There is no simple test for distinguishing the harmful kinds from the wholesome mushrooms, such as boiling them with a silver spoon, as is sometimes believed. To select properly the safe species of wild mushrooms from the poisonous ones requires a considerable knowledge of this subject, which can only be obtained by a careful study of textbooks.

Symptoms.—The first effects of poisonous mushrooms appear in from 6 to 12 hours after they have been eaten. They are headache, nausea, vomiting, pain in the stomach, and purging. Later on there is great thirst, muscular twistings or convulsions, the pulse is rapid and weak, and the skin cold and clammy. The patient may become delirious or go into a stupor.

Treatment.—The same as for ptomaine poisoning (p. 60). If atrophine sulphate is at hand or can be obtained, give $\frac{1}{100}$ of a grain every three hours until three doses have been taken. If the patient is vomiting, a hypodermic tablet of atrophine can be placed under the tongue and it will be absorbed even if it is not swallowed.

LIST OF REMEDIES AND THEIR USES

Doses.—Unless otherwise stated, the doses mentioned in this book are intended for adults. To determine the dose for children, add 12 to the age of the child and divide the age of the child by this sum. This fraction will represent the size of dose compared with that for an adult. For example, a child 6 years old will require $\frac{6}{6+12}=\frac{6}{18}$, or one-third of the adult dose.

Caution.—Preparations containing opium, such as laudanum, paregoric, camphor and opium pills, Sun Cholera Mixture tablets, etc., should not be used except where absolutely necessary, as their continued use is liable to produce the drug habit.

Alcohol.—Externally is useful as a mild antiseptic wash for wounds. As a liniment, pure or diluted with from 1 to 3 parts of water, is cooling and stimulating.

Aromatic spirits of ammonia.—Useful in hysteria, faintness, headache, flatulent colic, nervous debility, and as a stimulant in shock. Dose: ½ to 1 teaspoonful in water every half hour until three doses are taken.

Belladonna plaster.—Useful in coughs, colds, rheumatism in joints and arms, lumbago, and pains in small of back. Should be worn only long enough to have the desired effect. If the throat becomes dry or the pupils dilated, indicating belladonna poisoning, the plaster should be removed.

Bicarbonate of soda (*baking soda*).—Internally useful in sour stomach and heartburn. Dose: ½ to 1 teaspoonful in half tumbler of water. Repeat in half an hour if necessary.

Bismuth subnitrate (*5-grain tablets*).—Useful in dysentery, diarrhea, and heartburn. Dose: 2 to 4 tablets every three hours. (Crush before taking.)

Borax.—Useful in sore mouth. One tablespoonful dissolved in a pint of water and used as a mouth wash several times a day.

Boric acid (*boracic acid*).—One-half teaspoonful may be dissolved in a glass of water and used as a lotion for the eyes or ears.

Bromide of potash (*5-grain tablets*).—Useful in convulsions and delirium tremens. Dose: 3 to 5 tablets, dissolved in water, three times a day.

Brown-mixture lozenges.—Useful in bronchitis, coughs, and colds. Dose: 1 lozenge allowed to dissolve slowly in mouth; to be repeated as required.

Calomel ($\frac{1}{10}$*-grain tablets*).—Useful in constipation and dysentery. Dose for adults and children: Take 2 tablets every 15 minutes until 20 tablets are taken. When from 4 to 6 hours have elapsed, a Seidlitz powder or a dose of Rochelle or Epsom salt should be taken. The dose of the Seidlitz powder or salt should be proportionate to the age of the patient.

Camphorated oil (*for external use only*).—In sprains, bruises, neuralgia, rheumatism, and pains and swellings of the breasts or joints it should be gently rubbed on the painful part. Applied on hot flannel to chest and neck for colds.

Carbolic acid, liquid (*poison*).—Useful as an antiseptic and disinfectant when mixed in the proportion of 1 part of acid to 100 parts of hot water. Useful without dilution to arrest the development of boils and carbuncles and as an application to ulcers and venereal sores. Should be applied cautiously. The surface should be merely touched with a small piece of cotton moistened with a drop of the acid, care being taken not to burn the surrounding skin. Do not use internally.

Castor oil.—Useful in constipation. Dose: 1 to 2 tablespoonfuls.

Compound cathartic pills, vegetable.—Useful in constipation. Dose: 1 to 3 pills at night.

Compound solution of cresol.—Useful as antiseptic and disinfectant when mixed with water in from 1 to 3 per cent solutions. Do not use internally.

Epsom salt.—Useful in constipation and dysentery. Dose: 1 to 2 tablespoonfuls dissolved in as little water as possible. A little lemon juice and sugar may be added to disguise somewhat its bitter taste.

Essence of peppermint.—Useful in cramps, colds, gas in stomach, and colic. Dose: 10 drops to ½ teaspoonful in sweetened water or on sugar. Externally is useful in rheumatism, neuralgia, and toothache.

Flaxseed meal.—Useful as hot poultice to apply to boils and felons. Compresses wet with hot bichloride solution, 1 tablet to 5 pints of hot water, are better. To prepare flaxseed poultice a receptacle containing boiling water should be placed on the fire, the flaxseed meal should be gradually added and constantly stirred until the batter is jellylike. This should be evenly spread, with a thickness of from ¼ to ½ inch, to within 2 or 3 inches of the border of a cloth prepared for that purpose by folding in two or three layers. To prevent the poultice from adhering to the skin any of the following may be placed on its surface: Gauze, mosquito netting, cheesecloth, vaseline, or sweet oil.

Formalin (*poison*).—Used as a disinfectant generally in connection with permanganate of potash, as follows: For every 1,000 cubic feet of room space to be disinfected use ½ pound of permanganate of potash, powder or crystals, and from 1 to 1¼ pints of formalin. Add the permanganate of potash to the formalin contained in a deep tin pail. Effervescence begins at once, the room is tightly closed, and the operation is over in about 10 minutes. After 12 hours the room is opened and aired.

Glycerin.—Is a mild and healing application for sores, chaps, etc. When mixed with an equal quantity of water is useful in earache, hard, irritated, or feverish skin, chapped face or hands, split lips, and chafing.

Lead and opium wash (*poison*) (*shake well before using*).—Soothing external application in sprains and bruises.

Lemon juice.—Useful in fevers and inflammatory complaints. Hot lemonade on retiring is useful to aid in the relief of a cold in its first stages.

Lime water.—Internally is useful in soothing sick stomach, heartburn, diarrhea, and in dyspepsia attended with acidity of the stomach. Dose: 1 to 3 tablespoonfuls. For sick stomach, to be repeated after each effort to vomit. Externally as liniment (mixed with an equal quantity of linseed, cottonseed, or olive oil) for burns and scalds.

Mustard.—Externally is useful to draw the blood to the surface in case of pain where skin is not broken. Should be employed as a plaster or poultice, made as follows: 1 part of mustard is thoroughly mixed with from 2 to 4 parts of flour and made into a paste by the addition of a small amount of tepid water. This is then spread thinly to within 1 or 2 inches of the border of a cloth prepared by folding in two or three layers of old cotton cloth. The amount of mustard depends upon the degree of pain, the age of the patient, etc. Care should be taken that the mustard does not blister the skin. As a rule, mustard plasters or poultices should not be applied to children and old people, as they may blister the surface. Internally given to produce vomiting, 1 tablespoonful stirred to a cream with a cupful of tepid water.

Olive oil (*sweet oil*).—Internally is useful in constipation. Dose: 2 to 3 tablespoonfuls. Externally is a soothing application to blistered, burned, scalded, or other injured surfaces, also to piles.

Oil of wintergreen (*methyl salicylate*).—Useful, when mixed with an equal amount of olive oil, as an application for the relief of neuralgia, rheumatism, and painful joints. The oil should be gently rubbed on the painful area. If used about the head care should be taken that none gets into the eyes.

Permanganate of potash.—Useful in gonorrhea as an injection: ¼ teaspoonful dissolved in 2 quarts of water. One teaspoonful to a quart of water makes an efficient wash for perspiring feet. Useful in snake bites in the form of a concentrated solution which should be injected freely and immediately into and around the part which has been bitten. Useful as a general antiseptic in solution (1 tablespoonful dissolved in a quart of water). As a disinfectant, see "Formalin."

Peroxide of hydrogen solution.—Is cleansing and slightly antiseptic. Useful as a gargle in sore throat, diluted with an equal quantity of water. Useful to apply to wounds, boils, and abscesses, after diluting with from 1 to 3 parts of water.

Picric acid (poison) dissolve in water (½ per cent solution).—Useful to wet dressings with, as an application to burns.

Syrup of ipecac.—Useful in croup, bronchitis, cough, and hiccough. Dose: 10 drops every three hours. Also used to produce vomiting in doses of 1 to 2 tablespoonfuls.

Soap liniment (for external use only).—Useful in rheumatism, sprains, and bruises.

Spirit of camphor.—Internally is useful in nervous diarrhea, colic, and cramps. Dose: 5 to 30 drops, first added to sugar and then mixed with water.

Sun Cholera Mixture (poison) (15-minim tablets).—Useful in diarrhea, dysentery, and cholera morbus. Dose: 1 tablet.

Sweet spirits of niter.—Useful in fevers, flatulent colic, and colds. Dose: ½ teaspoonful in sweetened water every four hours.

Tincture of green soap.—Cleansing hands.

Tincture of iodine (poison) (for external use only).—Useful to disinfect wounds; should be diluted with an equal quantity of alcohol or water. If painted over inflamed surfaces, will sometimes be of value.

Turpentine.—Used in the form of hot turpentine stupes in typhoid fever, pneumonia, colds, bronchitis, lumbago, pleurisy, and inflammation of the bowels. The stupes are prepared by wringing out a double layer of thin flannel in a pint of hot water with which a teaspoonful of turpentine has been mixed. These applications should not be prepared too close to a fire on account of the inflammability of the turpentine.

Vaseline.—Internally and externally useful for the relief of cold in the chest. Externally useful in cold in the head, soothing irritated surfaces, burns, and scalds, and as a protective dressing.

LIST OF SURGICAL SUPPLIES FOR MEDICINE CHESTS

One adhesive plaster, 10-yard reel, 1 inch wide.

One dozen applicators, small, wooden.

One dozen bandages, 2-inch by 3-yard (½ dozen gauze and ½ dozen muslin).

One dozen bandages, 2-inch by 5-yard (½ dozen gauze and ½ dozen muslin).

One dozen bandages (4-inch by 5-yard muslin).

Six bandages, triangular (Esmarch's bandage), with figures printed on them showing the various ways they can be used.

One bistoury.

Three camel's-hair brushes.

One catheter, rubber, No. 20 F.

One corkscrew.

One forceps, artery (hemostatic forceps). This can be used to grasp a bleeding vessel until it can be tied, or until the doctor arrives. A catch holds the grip of the forceps. Sterilize by boiling.

One forceps, dressing or dissecting. Will be found convenient in cleaning up a wound and applying dressings; also in removing splinters, etc. Sterilize by boiling.

One fountain syringe, 2-quart.

One urethral syringe, glass. (For washing out wounds.)

Five yards gauze, picric acid. Good dressing for wounds and scalds.

Five yards gauze, plain, sterile.

One hot-water bottle, rubber, 2-quart. Metal bottle preferred.

Six medicine droppers.

One medicine glass.

Two nail brushes.

Two dozen safety pins, large.

One scissors, dressing, surgeon's, for cutting gauze and bandages. Sterilize by boiling.

One shears, for cutting cotton and muslin, etc.

Three splints, wooden. Straight and angular splints made of thin board, as described in chapter on "Fractures."

One spool of silk ligature, medium size.

Two surgical needles, in glass-stoppered bottles.

One thermometer, clinical, Fahrenheit.

One tooth forceps, incisor.

One tooth forceps, molar.

Two pieces wire gauze, made of heavy mesh malleable wire. When well padded can be wrapped around a fracture for temporary dressing.

Two sheets Yucca palm (a thin fiber board). Can be wrapped around a fracture for temporary dressing.

Gauze and bandages should be in paraffin-paper packages, sealed after sterilization.

Catheters and other rubber goods should be in sealed paraffin packages or envelopes, slightly dusted with sterile talcum on the inside of the package.

Scissors and instruments, if not in cases, may be coated with paraffin, which will come off when dipped in hot water.

DON'T FORGET TO CALL THE DOCTOR

INDEX

A

	Page
Abrasions	8
Accidents, how to handle	1
Apoplexy	54

B

Bandages, improvised	21
many tailed	20
roller, method of application	18
triangular	20
Bites, cats, etc	13
dog	11
snake	10
Bleeding from arteries	15
from neck	16
from nose	16
from veins	13
Bruises	22
Burns	37
from chemicals	39
from electricity	40

C

Chest, medicine, equipment of	66
Cramps, heat	36
Cuts, treatment	6

D

Dislocations	27
Drowning	42, 45

E

Emetics	55
Eye, black	23

F

Fainting	52
First-aid packets	6
Fits	53
Foreign bodies in the ear	24
in the eye	23
in the nose	24
in the throat	25
Fracture of the arm	31
of the back	32
of the bones of the foot	34
of the collar bone	32
compound	27
of the fingers	29
of the forearm	30
of the hand	30
Fracture of the knee cap	33
of the leg	34
of the neck	32
Pott's	34
of the ribs	32
simple	27
of the skull	31
of the thigh	33
of the toes	34
of the wrist	30
Freezing	40
Frost bite	40

H

Heat exhaustion	36
Hemorrhage. (*See* Bleeding.)	
Hydrogen peroxide	6

I

Injuries to the brain	53

L

List of remedies	62
List of surgical supplies	66
Lockjaw. (*See* Tetanus.)	

P

Plasters	21
Poison ivy	39
Poisoning (strong)	58
acids	54, 57, 58
alkalies	58
ammonia water	58
arsenic	59
bichloride of mercury	57
carbolic acid	56
general management of	55
heroin	57
illuminating gas	49
iodine	58
laudanum	57
morphine	57
mushroom	61
opium	57
ptomaine	60
strychnine	60

S

Scalds. (*See* Burns.)	
Shock	17
electrical	48
treatment of	17

	Page
Sprains	26
Splinters	9
Stings, bee	11
centipede	11
insect	11
scorpion	11
tarantula	11
Suffocation	42
Sunburn	37
Sunstroke	35

T

Tetanus	8
Tourniquets	15

U

	Page
Unconsciousness	51
Use of remedies	62

W

Wounds	4
of the abdomen	9
disinfection of	6
from bullets	9
from fish hooks	9
inflamed	8
lacertated	7
method of packing	13
puncture	7
scalp	9

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
U.S.GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
15 CENTS PER COPY

614.09
Un3m
no.22

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 22

UNIVERSITY OF ILLINOIS LIBRARY

Regulations for the Control of Arsphenamine, Neoarsphenamine, and Sodium Arsphenamine

in the District of Columbia and in Interstate Traffic

Supplementary to Regulations for the Sale of Viruses, Serums, Toxins, and Analogous Products, approved February 12, 1919 Miscellaneous Publication No. 10

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

REGULATIONS FOR THE CONTROL OF ARSPHENAMINE, NEOARSPHENAMINE, AND SODIUM ARSPHENAMINE.

TREASURY DEPARTMENT,
Washington, D. C., June 15, 1920.

The following regulations have been prepared by the undersigned board of officers, in accordance with the provision of section 4 of an act of Congress entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes." They are hereby promulgated and will supplement the regulations for the sale of viruses, serums, toxins, and analogous products, approved February 12, 1919.

M. W. IRELAND,
Surgeon General, U. S. Army.
W. C. BRAISTED,
Surgeon General, U. S. Navy.
J. C. PERRY,
Acting Surgeon General, U. S. Public Health Service.

Approved June 21, 1920:
D. F. HOUSTON,
Secretary of the Treasury.

G14.09
U n3m
no. 22

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE AND SALE OF ARSPHENAMINE.

1. Arsphenamine shall not be sold in interstate traffic, or in the District of Columbia, or exported or imported, except as provided herein.

2. Arsphenamine shall be offered for sale only in colorless glass ampules containing an atmosphere of an inert gas, or in a vacuum.

3. Each ampule shall be plainly marked so as to show the license number, the lot number, the name of the preparation, the actual amount of arsphenamine in the container, and the name and address of the manufacturer, in the following manner:

License No. _____. Lot No. _____.
This package contains _____ grams of arsphenamine (hydrochloride of 3-diamino-4-dihydroxy-1-arsenobenzene) and conforms with regulations and tests prescribed by the United States Public Health Service. Made by _____

The name arsphenamine shall be given precedence on the labels of containers and packages over the particular brand or trade name, and the size of type and display used for the name arsphenamine shall be at least as conspicuous as that used for the brand or trade name.

4. Each lot of the finished product shall be tested by the manufacturer for arsenic content and toxicity.

(1) The total arsenic content of the drug as obtained from the ampule shall not be below 30 per cent nor above 32 per cent, when determined according to Lehmann's method as described in Public Health Reports, volume 33, June 21, 1918, page 1012.

(2) The maximum tolerated dose shall not be less than 100 milligrams per kilo body weight for albino rats when tested as follows:

(*a*) Animals must be well nourished and free from disease, weighing from 100 to 150 gm. Pregnant animals shall not be used.

(*b*) *Feeding and care of animals.*—The rats should be fed both before and during the period of observation on a ration consisting of white bread, cracked corn, oats, cow's milk, and, in addition, twice weekly, fresh beef and cabbage. An adequate supply of fresh, clean water should be provided at all times. The rats should have no access to food for from 18 to 12 hours preceding the injection, though water should be supplied during this time.

(*c*) *Preparation of solution.*—The drug shall be dissolved in freshly glass-distilled water and made into the alkaline solution by the addition of 0.9 cc. N/1 sodium hydrate for each 0.1 gm. of the drug. The final concentration of the drug shall be in the proportion of 2 parts to 100. The drug shall be completely soluble in water in this proportion.

(*d*) *Method of injection.*—This should be made into the saphenous vein by means of a burette or a syringe, accurately graduated to 0.01 cc. When hemorrhage occurs it should be controlled mechanically.

(*e*) *Rate of injection.*—This shall be at from 12 to 15 seconds for each 0.1 cc. of the solution.

(*f*) An anesthetic is not required.

(*g*) For each toxicity test a series of not less than five rats shall be used, and at least 60 per cent of the animals injected must survive at least 48 hours from the time of the injection, provided that if the first test is made on five rats only and more than one die the test must be repeated and the final result based on the total number of rats injected.

5. In addition to tests made by the manufacturer before the drug is put in ampules, final tests of the product as prepared for the market shall be made on each lot by the United States Public Health Service before its release. For this purpose samples of each lot shall be forwarded by the manufacturer to the Hygienic Laboratory of the United States Public Health Service. The number of samples supplied shall not be less than 10 ampules from any lot, and from lots of over 1,000 ampules 1 per cent shall be furnished. Each ampule forwarded shall contain at least 0.6 gm. arsphenamine. Accompanying each lot, the manufacturer shall send a copy of the report of the toxicity test and arsenic determination on which it was passed.

6. Officers of the United States Public Health Service, when duly detailed, may enter establishments for the purpose of securing samples and conducting inspections.

7. When lots have satisfactorily passed the prescribed tests, they may be offered for sale; but the right is reserved to require the withdrawal from the market of any lot designated by the Surgeon General of the United States Public Health Service.

8. Manufacturers shall retain 2 per cent of the product from each lot for a period of three months from the time the preparation is placed on the market, provided that in no case this is less than 10 ampules of at least 0.6 gm. each.

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE AND SALE OF NEOARSPHENAMINE.

1. Neoarsphenamine shall not be sold in interstate traffic, or in the District of Columbia, or exported or imported except as provided herein.

2. Neoarsphenamine shall be offered for sale only in colorless glass ampules containing an atmosphere of an inert gas, or in a vacuum.

3. Each ampule shall be plainly marked so as to show the license number, the lot number, the name of the preparation, the actual amount of neoarsphenamine in the container, and the name and address of the manufacturer in the following manner:

License No. _____ Lot No. _____

This package contains _____ grams of neoarsphenamine (a compound prepared from arsphenamine by means of formaldehyd-sulphoxylate) and conforms with the regulations and tests prescribed by the United States Public Health Service. Made by _____

The name neoarsphenamine shall be given precedence on the labels of containers and packages over the particular brand or trade name, and the size of type and the display used for the name neoarsphenamine shall be at least as conspicuous as that used for the brand or trade name.

4. Each lot of the finished product shall be tested by the manufacturer for arsenic content and toxicity.

(1) The total arsenic content of the drug as obtained from the ampule shall not be below 18 nor above 20 per cent when determined according to Lehmann's method as described in Public Health Reports, volume 33, June 21, 1918, page 1012. The drug should be freely mobile in ampule and soluble in cold water (1 gm. in 10 c. c. of water in 5 minutes).

(2) The maximum tolerated dose shall not be less than 200 milligrams per kilo body weight for albino rats, when tested as follows:

(*a*) Animals must be well nourished and free from disease, weighing from 100 to 150 gm. Pregnant animals shall not be used.

(*b*) The rats should be fed both before and during the period of observation on a ration consisting of white bread, cracked corn, oats, cow's milk, and, in addition, twice weekly, fresh beef and cabbage. An adequate supply of fresh, clean water should be provided at all times. The rats should have no access to food for from 18 to 12 hours preceding the injection, though water should be supplied during this time.

(*c*) *Preparation of solution.*—The drug shall be dissolved in cold glass-distilled water. A preparation which is not readily soluble in cold distilled water should be discarded at once as a dangerous product. The final concentration of the solution shall be in the proportion of 4 parts per 100.

(*d*) *Method of injection.*—This should be made into the saphenous vein by means of a burette or a syringe, accurately graduated to 0.01 cc. When hemorrhage occurs it should be controlled mechanically.

(*e*) *Rate of injection.*—This shall be at from 12 to 15 seconds for each 0.1 cc. of the solution.

(*f*) An anesthetic is not required.

(*g*) For each toxicity test a series of not less than five rats shall be used, and at least 60 per cent of the animals injected must survive at least seven days from the time of the injection, provided that if the first test is made on five rats only and more than one die the test must be repeated and the final result based on the total number of rats injected.

5. In addition to tests made by the manufacturer before the drug is put in ampules, final tests of the product as prepared for the market shall be made on each lot by the United States Public Health Service before its release. For this purpose samples of each lot shall be forwarded by the manufacturer to the Hygienic Laboratory of the United States Public Health Service. The number of samples supplied shall not be less than 10 ampules from any lot, and from lots of over 1,000 ampules 1 per cent shall be furnished. Each ampule forwarded shall contain at least 0.9 gm. neoarsphenamine. Accompanying each lot, the manufacturer shall send a copy of the report of the toxicity test and arsenic determination on which it was passed.

6. Officers of the Public Health Service, when duly detailed, may enter establishments for the purpose of securing samples and conducting inspections.

7. When lots have satisfactorily passed the prescribed tests, they may be offered for sale; but the right is reserved to require the withdrawal from the market of any lot designated by the Surgeon General of the United States Public Health Service.

8. Manufacturers shall retain 2 per cent of the product from each lot for a period of three months from the time the preparation is placed on the market, provided that in no case this is less than 10 ampules of 0.9 gm. each.

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE AND SALE OF SODIUM ARSPHENAMINE.

1. Sodium arsphenamine shall not be sold in interstate traffic, or in the District of Columbia, or exported or imported, except as provided herein.

2. Sodium arsphenamine shall be offered for sale only in colorless glass ampules containing an atmosphere of inert gas, or in a vacuum.

3. Each ampule shall be plainly marked so as to show the license number, the lot number, the name of the preparation, the actual amount of sodium arsphenamine in the container, and the name and address of the manufacturer, in the following manner:

License No._____. Lot No._____.
This package contains _____ grams of sodium arsphenamine (a compound prepared from arsphenamine by treating with sodium hydroxide) which conforms with the regulations and tests prescribed by the United States Public Health Service. Made by _____.

The name "Sodium arsphenamine" shall be given precedence on the labels of containers and packages over the particular brand or trade name, and the size of type and display used for the name "Sodium arsphenamine" shall be at least as conspicuous as that used for the brand or trade name.

4. Each lot of the finished product shall be tested by the manufacturer for arsenic content and toxicity.

(1) The total arsenic content of the drug as obtained from the ampule shall be 20 per cent, plus or minus 1 per cent (20 $\pm$ 1 per cent) i. e., the percentage of arsenic shall be between 19 and 21 per cent, preferably as near 20 per cent as possible, when determined according to Lehmann's method as described in Public Health Reports vol. 33, June 21, 1918, page 1012.

(2) The maximum tolerated dose shall be not less than 180 mgm. per kilo bodyweight for the albino rat when tested as follows:

(*a*) Animals must be healthy and weigh from 100 to 150 grams. Pregnant animals shall not be used.

(*b*) *Feeding and care of animals.*—The rats shall be fed both before and during the period of observation on a ration consisting of white bread, cracked corn, cow's milk, and, in addition, twice weekly, fresh beef and cabbage. An adequate supply of fresh, clean water shall be provided at all times. The rats shall have no access to food for from 18 to 12 hours preceding the injection, though water should be supplied during this time.

(*c*) The drug must be readily and completely soluble at room temperature in freshly glass-distilled water, in which it shall be dissolved for toxicity testing. The concentration of the drug shall be in the proportion of 4 parts in 100.

(*d*) *Method of injection.*—This should be made into the saphenous vein by means of a burette or syringe, accurately graduated to 0.01 c. c. When hemorrhage occurs it should be controlled mechanically.

(*e*) *Rate of injection.*—This shall be at from 12 to 15 seconds for each 0.1 c. c. of the solution.

(*f*) An anaesthetic is not required.

(*g*) For each toxicity test a series of not less than five rats shall be used, and at least 60 per cent of the animals injected must survive at least 48 hours from the time of the injection, provided that if the first test is made on five rats only and more than one die the test must be repeated and the final result based on the total number of rats injected.

5. In addition to tests made by the manufacturer final tests of the product as prepared for the market shall be made on each lot by the United States Public Health Service before its release. For this purpose samples of each lot shall be forwarded by the manufacturer to the Hygienic Laboratory of the United States Public Health Service. The number of samples supplied shall not be less than 10 ampules from any lot, and from lots of over 1,000 ampules 1 per cent shall be furnished. Each ampule forwarded shall contain at least 0.6 gm. of sodium arsphenamine. Accompanying each lot, the manufacturer shall send a copy of the report of the toxicity test and arsenic determination on which it was passed.

6. Officers of the Public Health Service, when duly detailed, may enter establishments for the purpose of securing samples and conducting inspections.

7. When lots have satisfactorily passed the prescribed tests they may be offered for sale, but the right is reserved to require the withdrawal from the market of any lot designated by the Surgeon General of the United States Public Health Service.

8. Manufacturers shall retain 2 per cent of the product from each lot for a period of three months from the time the preparation is placed on the market, provided that the quantity so retained is in no case less than 10 ampules of at least 0.6 gm. each.

[32 STAT., 728.]

AN ACT To regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after six months after the promulgation of the regulations authorized by section four of this act no person shall sell, barter, or exchange, or offer for sale, barter, or exchange in the District of Columbia, or send, carry, or bring for sale, barter, or exchange from any State, Territory, or the Distict of Columbia into any State, Territory, or the District of Columbia, or from any foreign country into the United States, or from the United States into any foreign country, any virus, therapeutic serum, toxin, antitoxin, or analogous product applicable to the prevention and cure of diseases of man, unless (a) such virus, serum, toxin, antitoxin, or product has been propagated and prepared at an establishment holding an unsuspended and unrevoked license, issued by the Secretary of the Treasury as hereinafter authorized, to propagate and prepare such virus, serum, toxin, antitoxin, or product for sale in the District of Columbia, or for sending, bringing, or carrying from place to place aforesaid; nor (b) unless each package of such virus, serum, toxin, antitoxin, or product is plainly marked with the proper name of the article contained therein, the name, address, and license number of the manufacturer, and the date beyond which the contents can not be expected beyond reasonable doubt to yield their specific results: *Provided*, That the suspension or revocation of any license shall not prevent the sale, barter, or exchange of any virus, serum, toxin, antitoxin, or product aforesaid which has been sold and delivered by the licentiate prior to such suspension or revocation, unless the owner or custodian of such virus, serum, toxin, antitoxin, or product aforesaid has been notified by the Secretary of the Treasury not to sell, barter, or exchange the same.

SEC. 2. That no person shall falsely label or mark any package or container of any virus, serum, toxin, antitoxin, or product aforesaid; nor alter any label or mark on any package or container of any virus, serum, toxin, antitoxin, or product aforesaid so as to falsify such label or mark.

SEC. 3. That any officer, agent, or employee of the Treasury Department, duly detailed by the Secretary of the Treasury for that purpose, may, during all reasonable hours, enter and inspect any establishment for the propagation and preparation of any virus, serum, toxin, antitoxin, or product aforesaid for sale, barter, or exchange in the District of Columbia, or to be sent, carried, or brought from any State, Territory, or the District of Columbia into any other State or Territory or the District of Columbia, or from the United States into any foreign country, or from any foreign country into the United States.

SEC. 4. That the Surgeon General of the Army, the Surgeon General of the Navy, and the supervising Surgeon General of the Marine Hospital Service be, and they are hereby, constituted a board with authority, subject to the approval of the Secretary of the Treasury, to promulgate from time to time such rules as may be necessary in the judgment of said board to govern the issue, suspension, and revocation of licenses for the maintenance of establishments for the

propagation and preparation of viruses, serums, toxins, antitoxins, and analogous products, applicable to the prevention and cure of diseases of man, intended for sale in the District of Columbia, or to be sent, carried, or brought for sale from any State, Territory, or the District of Columbia, into any other State, Territory, or the District of Columbia, or from the United States into any foreign country, or from any foreign country into the United States: *Provided*, That all licenses issued for the maintenance of establishments for the propagation and preparation in any foreign country of any virus, serum, toxin, antitoxin, or product aforesaid, for sale, barter, or exchange in the United States, shall be issued upon condition that the licentiates will permit the inspection of the establishments where said articles are propagated and prepared, in accordance with section three of this act.

SEC. 5. That the Secretary of the Treasury be, and he is hereby, authorized and directed to enforce the provisions of this act and of such rules and regulations as may be made by authority thereof; to issue, suspend, and revoke licenses for the maintenance of establishments aforesaid, and to detail for the discharge of such duties such officers, agents, and employees of the Treasury Department as may in his judgment be necessary.

SEC. 6. That no person shall interfere with any officer, agent, or employee of the Treasury Department in the performance of any duty imposed upon him by this act or by regulations made by authority thereof.

SEC. 7. That any person who shall violate or aid or abet in violating any of the provisions of this act shall be punished by a fine not exceeding five hundred dollars or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court.

SEC. 8. That all acts and parts of acts inconsistent with the provisions of this act be, and the same are hereby, repealed.

Approved July 1, 1902.

○

614.09
Un3m
1922
1923

TREASURY DEPARTMENT

UNITED STATES PUBLIC HEALTH SERVICE

UNIVERSITY OF ILLINOIS LIBRARY
DEC 31 1923

MISCELLANEOUS PUBLICATION No. 22

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE, IMPORTATION AND SALE OF ARSPHENAMINE

AND ITS DERIVATIVES

Neoarsphenamine, Sodium Arsphenamine, Silver Arsphenamine, Neosilverarsphenamine, Phospharsphenamine and Sulpharsphenamine, referred to collectively as "The Arsphenamines."

Supplementary to Regulations for the Sale of Viruses Serums, Toxins, and Analogous Products Approved August 1, 1923

Miscellaneous Publication No. 22
Revised.

LIBRARY OF THE
UNIVERSITY OF ILLINOIS

WASHINGTON
GOVERNMENT PRINTING OFFICE
1923

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE, IMPORTATION, AND SALE OF APSPHENAMINE AND ITS DERIVATIVES, NEOARSPHENAMINE, SODIUM ARSPHENAMINE, SILVER ARSPHENAMINE, NEOSILVERARSPHENAMINE, PHOSPHARSPHENAMINE, AND SULPHARSPHENAMINE, REFERRED TO COLLECTIVELY AS "THE ARSPHENAMINES."

TREASURY DEPARTMENT,
Washington, D. C., August 28, 1923.

The following regulations have been prepared by the undersigned board of officers, in accordance with the provisions of section 4 of an act of Congress entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes." They are hereby promulgated and will supplement the regulations for the sale of viruses, serums, toxins, and analogous products, approved August 1, 1923.

WALTER D. McCAW,
Acting Surgeon General, U. S. Army.
E. R. STITT,
Surgeon General, U. S. Navy.
H. S. CUMMING,
Surgeon General, U. S. Public Health Service.

Approved September 20, 1923:
A. W. MELLON,
Secretary of the Treasury.

C14.09
Am3m
no.22
1923

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE, IMPORTATION, AND SALE OF APSPHENAMINE AND ITS DERIVATIVES, NEOARSPHENAMINE, SODIUM ARSPHENAMINE, SILVER ARSPHENAMINE, NEOSILVERARSPHENAMINE, PHOSPHARSPHENAMINE, AND SULPHARSPHENAMINE, REFERRED TO COLLECTIVELY AS "THE ARSPHENAMINES."

---

1. The arsphenamines offered for sale or importation shall not be sold in interstate traffic nor exported or imported except as provided herein.

2. The arsphenamines shall be manufactured only in laboratories which have been duly licensed by the Secretary of the Treasury upon recommendation of the Surgeon General of the Public Health Service.

3. Laboratories licensed for the manufacture of any of the arsphenamines shall be subject to inspection, at any time, by officers of the Public Health Service when detailed by the Surgeon General.

4. The manufacturer shall keep records (*a*) of the production, (*b*) of the tests made to determine the purity and safety, and (*c*) of the distribution of each lot of any of the arsphenamines which is to be sold under these regulations.

5. The tests to be made for determining the purity and safety of each lot of any of the arsphenamines shall include those for (*a*) stability, (*b*) solubility, (*c*) arsenic content, and (*d*) relative nontoxicity.

(*a*) Stability shall be determined by exposing the ampuled product to a temperature of 56° C. for a period of at least 24 hours, during which time it should show no marked change in color, consistency, or solubility.

(*b*) Any product, both before and after being subjected to the above test, shall be *completely* soluble in distilled water within 15 minutes, in a concentration as great as is recommended for its intravenous administration.

(*c*) The arsenic content shall be determined by Lehmann's method as described in Public Health Reports, volume 33, June 21, 1918, page 1012; the minimal amount allowed for arsphenamine is 30 per cent and for any of its derivatives above mentioned, 19 per cent. Variations above these figures are permissible provided the theoretical arsenic content of the preparation is not exceeded.

(*d*) The relative nontoxicity shall be determined by administration of the arsphenamines, in the concentrations and doses given below

into the saphenous vein of healthy albino rats weighing from 100 to 150 grams (pregnant females excluded) at the rate of 0.1 c. c. in 12 to 15 seconds. For each toxicity test at least five rats shall be used, and at least 60 per cent must survive the periods of observation stated below, but, in any case, the final result must be based on the total number of rats injected. The rats should be fed a well-balanced ration [1] but should have no access to food for from 12 to 18 hours preceding injection. An adequate supply of fresh, clean water should be provided at all times. If it is not practicable to use rats, rabbits weighing 1,500 to 2,000 gm. may be substituted, the injections to be made intravenously into the ear vein, and the dosage in mgm. per kg. to be the same as for rats; or, mice may be substituted provided the dosage in mgm. per kg. is made 20 per cent higher. The mice should weigh about 20 gm. and are injected in a tail vein.

Doses, concentrations, and periods of observation.

Product.	Tolerated dose in mgm. per kg.	Concentration of solution.	Period of observation.
		Per cent.	*Days*
Arsphenamine [1]	120	2	2
Neoarsphenamine	240	4	6
Sodium arsphenamine	180	4	2
Silver arsphenamine [2]	140	2	2
Neosilverarsphenamine [3]	240	4	4
Phosphorsphenamine	240	4	3
Sulpharsphenamine [4]	300	4	3

[1] Arsphenamine must be converted into its disodium salt solution before making up to final volume, by adding 0.85 c. c. normal sodium hydrate per 0.1 gram of the drug used. To insure stabilization of the solution it should stand at room temperature for from 15 to 30 minutes before the injections are begun.
[2] Silver arsphenamine should have a silver content of 13 per cent, but a variation of 1 per cent in either direction is permissible.
[3] Neosilverarsphenamine should have a silver content of between 6 and 7 per cent.
[4] Sulpharsphenamine should have a sulphur content of about 10 per cent with permissible variations in either direction of 1 per cent.

6. The manufacturer shall forward to the Hygienic Laboratory not less than 10 ampules, maximum size human dose, from each lot, together with the protocols of the tests set forth above; these protocols should be furnished on forms approved by the Surgeon General, Public Health Service, or his representative.

7. Manufacturers shall retain 2 per cent of the product from each lot for a period of three months from the time the preparation is

[1] The following simple diet in use at the Hygienic Laboratory has proved to be highly satisfactory and is recommended, as it is believed that a standard diet is essential if comparable results among laboratories are to be obtained:

	Per cent.		Per cent.
Graham flour	53.5	Codliver oil	2.0
Skimmed milk powder	33.3	Sodium chloride	1.0
Whole corn meal	10.0	Calcium carbonate	.2

(1) Mix the cod liver oil with the corn meal.
(2) Mix all other constituents.
(3) Mix (1) and (2).

placed on the market, provided that in no case the amount retained is less than 10 ampules of maximum size doses.

8. Each *ampule* shall be plainly labeled showing the amount (in grams) of drug contained, the lot number, the official name of the preparation, and the name of the manufacturer. The label should be small, leaving as much as possible of the glass exposed to afford ready inspection of the drug. Preferably the lower margin of the label should be not less than three-fourths inch from the bottom of the ampule. The container of one or more ampules shall show the name of the manufacturer, his address, the license number, the official name of the drug, the amount contained in each ampule, and the lot number.

9. When lots have satisfactorily passed the prescribed tests they may be offered for sale upon being released by the Hygienic Laboratory, but the right is reserved to require withdrawal from the market of any lot designated by the Surgeon General of the United States Public Health Service.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
5 CENTS PER COPY
PURCHASER AGREES NOT TO RESELL OR DISTRIBUTE THIS
COPY FOR PROFIT.—PUB. RES. 57, APPROVED MAY 11, 1922

4.09
n3m
.23

AUG 30 1920

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 23
April, 1920

INSTRUCTIONS FOR THE USE OF CHILD HYGIENE SURVEY CARDS

Prepared by direction of the Surgeon General

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

614.09
Un3m
no.23

INSTRUCTIONS FOR USE OF CHILD HYGIENE SURVEY CARDS.

GENERAL INSTRUCTIONS.

The following instructions are to be observed in filling out the child hygiene forms and are designed to secure uniformity in collecting and recording data.

In filling out any of the child hygiene forms it is important that an entry be made in answer to *every* question and in *every* space on any schedule except that which is especially designated to be left blank. If an answer is "No" or "None" or "O" (zero), it is equally important for that answer to be put in as it would be if the answer were "Yes" or something else.

If it is impossible to fill in any space with the desired fact, enter "unk" (unknown), and indicate briefly why. If the information secured is not definite or exact, enter such information as it is possible to obtain and note that it is only approximately correct.

Avoid making any comments or observations on the cards unless they relate definitely to one of the questions and then make them brief and definite. In keeping these records it is well to bear in mind that the more definite, concise, and exact the information is the easier it will be to utilize the data thus recorded. Ambiguous wording and unnecessarily qualified statements are difficult to interpret and frequently impossible to tabulate.

It may be desirable for the worker to have some general notes or information which will be of use in dealing with individual cases. These notes should not be placed on the record cards but on slips of paper and filed in the family folder card (Form No. 8) for current use.

Where the same entry appears on two or more cards, such as the name and address of father or mother, care should be taken that the entries are identical on the various cards. If discrepancies exist, special inquiry should be made and the proper corrections should be made on the cards.

Heading.—In filling in the name of the child or of the mother at the top of the cards, the surname should always be entered first and followed by the given name, as indicated below the space for the name.

Sex.—Put a check (√) mark in the space after M. if child is a male or in the space following F. if a female.

Race.—Check (√) the space following W. if white; check C. if colored. Enter Japanese, Chinese, Indian, etc., if that is the answer.

Age.—For child of 2 years or over, enter age in years and months to the nearest month; for child under 2 years but over 2 months, enter age in months to the nearest month; for child under 2 months but over 1 week, enter age in weeks to the nearest week; for child less than 1 week old, enter age in days.

Name of father, mother, parent, guardian, etc.—Always enter the person's own given name, as, "Mrs. Mary Smith," not "Mrs. John Smith."

INSTRUCTIONS FOR USE OF CHILD HYGIENE SURVEY CARDS.

INSTRUCTIONS FOR USE OF CHILD HYGIENE FORM NO. 4—SCHOOL CARD.

This card is designed for use in schools having either full-time or part-time nursing care and medical inspection. It has therefore been divided into three parts, to be filled in by the teacher, the nurse, and the medical inspector, respectively.

To the Teacher.

Name of school.—Enter the name of the school, or if the school is known by a number, its number.

County and State.—Fill in the name of the county and the abbreviation for the State on *every* card.

CHILD'S SICKNESS RECORD DURING SESSION.

This record is designed to show how much the attendance at school was cut down on account of sickness and other causes. For this reason it is necessary to know how many days each month the child was enrolled, i. e., how many days the child could have attended school had it not been absent for some particular cause. The sickness record should be filled out at the end of each school month.

Number of days enrolled.—By "Number of days enrolled" is meant the total number of school days during the current month on which the child should have been present had it not been absent for sickness or any other cause. "Number of days enrolled" is not equivalent to "Number of days belonged" as this expression is commonly understood in school reports. That is, in some school systems it is the custom to drop a child's name from the roll after the third day of continuous absence, so that in a school month of 20 days, for example, a pupil absent for any reason for five consecutive days is counted as belonging for only three of the five days, and in the record of attendance for the entire month is counted as belonging only for 18 days. In making up the "Number of days enrolled," therefore, for a given pupil, no days should be dropped from the record in case of absence for any cause except permanent withdrawal from school. In this way the record as finally made up will include both *total* number of days present and *total* number of days actually absent. Enter for each month the number of days the child was

actually "enrolled." For example, if John did not enter school until February 15, he should not be counted as enrolled for the entire month of February, but only for that number of school days in February after February 14. In like manner, if John quit school at the close of March 10 he should be counted as enrolled for the *number of school days* from February 15 to the end of February and from March 1 to March 10, inclusive.

Number of days present.—Enter for each month the number of days the child was actually present at school. The number of days present plus the number of days absent from all causes should in all cases equal the number of days "enrolled," i. e., absence from toothache plus absence from colds plus absence from other sickness plus absence from other causes plus days present should always equal days "enrolled."

Number of days absent—Toothache.—Enter under the appropriate month the number of days the child was absent because of toothache.

Number of days absent—Colds.—It is desirable to know the loss in school attendance caused by "common colds." If the child's absence is due to sickness and it is ascertained that the sickness was a cold, enter on this line the number of days lost on account of colds. It is important to bear in mind that a child might be absent from school for other sickness than colds or for causes other than sickness in the same month or months (period of absence). In such case the absence should be divided up and entered under the proper causes, the total days absent from the various causes always equaling the total absence for the period.

Number of days absent—Other sickness.—Enter the number of days the child was absent during the month on account of any other sickness, irrespective of the nature of the illness. Information for this and similar entries can be ascertained by questioning the child upon his return to school after an absence or from written excuses sent by the parent or from the school nurse. If there is reason to believe the written excuses sent by the parent are not correct, it is advisable to make as correct an entry as possible from any other sources of information you may happen to have.

Number of days absent—Other causes.—This includes all causes other than those enumerated on the card, i. e., other than toothache, colds, and other sickness. Accidents should be included in "*Other causes*" and *not* in "*Other sickness.*"

CHILD'S SCHOLARSHIP RECORD.

This record should not be filled out until the *end of the present session.*

Age at which child commenced school.—This information can be readily ascertained from the child itself.

Grades repeated by child prior to this session.—If a grade is repeated more than once, this should be stated. For example, John is now in the fourth grade, had to repeat the second grade once, and the third grade twice; the answer should be second [1], third [2].

Grade in which the child is enrolled this session, i. e., grade in which it is enrolled during the session for which this record is kept.

Character of child's work at school during the present session.—Place a check (√) mark for "Excellent," or "Good," or "Fair," etc., according to your opinion of the child's school work or according to the report which you have made for the child.

Promoted or failed at the end of this session.—Enter "Promoted" or "Failed," as the case may be.

Cause of failure.—If the child failed to be promoted at this session, state what, in your opinion, were the causes of his failure. It is quite possible, of course, that his work was unsatisfactory because he was absent from school, because he was in poor health, or for other reasons than sickness, or because he is naturally dull, or because he is too fond of play and did not apply himself to his studies, or because of other reasons. It is desired to have your own frank opinion of what was the cause of failure if the child was not promoted.

To the Nurse.

Name of parent or guardian—Occupation.—Enter the name of the child's parent or guardian and his occupation. Make the occupation designation as specific as possible, e. g., laborer in steel mill, coal miner, brakeman, etc.

Remarried (*father*, ——; *mother*, ——).—If either parent is remarried, place a check (√) mark in the appropriate space.

Father living; mother living.—Check (√) if living; if dead, state year and cause of death as specifically as possible.

Number of brothers living, etc.; number of sisters living, etc.—Enter the number of brothers living and the number dead. State the cause of death of each one. The same information should be given on the next line for the number of sisters living and dead.

Diseases during the present session.—If the child has any of the diseases named on the card during the session for which this record is kept, enter in the blank after the name of the disease the month in which the child had the disease in question. If the child did not have any of the diseases named, be certain to enter "no" for each disease it did not have. If there are any other diseases than those named, especially rheumatic fever, chorea (St. Vitus's dance), and malaria, which caused absence on the part of the child during this session, state what disease it was and the month in which it occurred.

Tuberculosis.—Ascertain whether there is tuberculosis in the child's home; and if not, whether the child has at any time been exposed to tuberculosis in its home.

Vaccination.—Vaccination data should show the number of children who have submitted to vaccination and the number who have not. Information relating to the date of last successful vaccination is desirable from the standpoint of determining the need of revaccination. The average period of immunity against small pox is about seven years, while that against typhoid fever is about four years.

Answer "yes" or "no" in the space following vaccination (smallpox) if the child has or has not been vaccinated.

Enter the number of times vaccinated and the date, as nearly as it can be ascertained, when the last successful vaccination occurred. If it is not practicable to get the date exactly, it is often possible to ascertain the age at which the child was last successfully vaccinated.

PHYSICAL EXAMINATION.

Each child should be examined separately and in a quiet place.

Height.—Should be recorded in inches and half inches (not feet and inches). If children are measured *with* shoes, draw a line through the word *without;* if *without* shoes, draw a line through the word *with.* The measurements taken at the end of the session should be made the same way as at the beginning, i. e., if the child is measured *without* shoes at the beginning he should be measured *without* shoes at the end. By end of the session is meant the last month of the school year. Similarly, at the beginning of the session is meant during the first month of the school year.

Sitting height.—The child should sit erect on shelf or box, with back against wall. Distance from shelf or box to level of top of head should be recorded.

Weight.—Remove all wraps and heavy coats before weighing children. Specify, as directed under *height*, whether weight was taken with or without shoes; if height was measured *with* shoes, also weigh the child *with* shoes, but if measured *without* shoes, then weigh the child *without* shoes. Be sure that this rule is followed each time the child is weighed, so that the weights at the beginning and at the end of the session will be comparable. Record weight in terms of pounds and one-fourth pounds.

Chest expansion is the difference between the measurement of chest fully expanded (deep inspiration) and when emptied of air (expiration). The circumference of the chest at both inspiration and expiration should be recorded.

Hearing should be recorded in the term of tenths of the normal distance at which the ticking of a watch may be heard. The watch

used for this purpose should first be tested to determine the distance at which it can be heard by one with normal hearing. For example, if this distance is 30 inches it would be recorded 10/10. If a child could hear the watch at a distance of 15 inches only, namely, 15/30, this would be recorded as 5/10. Each ear should be tested separately, the teacher standing behind the pupil, who should keep the ear not being tested covered with the hand and the eyes closed during the test. Do not introduce a finger into the ear canal to prevent hearing.

Vision should be recorded in tenths of the normal distance (Lowell chart) in the case of each eye separately, first, without glasses in case glasses are used, and then with glasses. Lack of vision in either eye is recorded as 0/10. In the absence of a test chart graduated in tenths, the ordinary practice of recording vision in twentieths may be followed.

Vision charts should be placed in such position as to receive illumination from one side, and never in a position that obliges the child to face a window or other light source while reading the chart. Visual tests should not be made on dark, cloudy days.

Use of toothbrushes.—The records should show whether the toothbrush is used "daily," "occasionally," or "never."

Skin eruptions.—The records should state the part of the body affected.

Pediculosis.—The answer to this question should show whether only lice or nits are present, or both.

Other defects.—Under this heading should be recorded all deformities, especially of the spine, including round shoulders, all paralytic conditions, missing fingers, arm, or leg, or any other defect not already recorded.

An unused wooden tongue depressor should be used for each child. After use it should be broken, placed in a proper receptacle, and burned at the end of the day's inspection.

For the Medical Inspector.

Defects of the auditory apparatus.—The records should show not only the degree of deafness, but also the condition of the eardrum, whether dull, congested, retracted, perforated, or obscured by impacted wax. The presence of discharge should also be noted, whether from one or both ears, designating the ear if only one is affected.

Defects of visual apparatus.—It is not only desirable to know the refractive error present in particular cases, but whether the eye is astigmatic, hyperopic, or myopic. An astigmatic child usually correctly names a number of the letters in each test line. The presence

of cataracts, choroiditis, keratitis, iritis, opacities, optic-atrophy, blepharitis, districhiasis, ectropion and entropion, ptosis, and trichiasis should be recorded. In the case of conjunctival inflammations it should be stated whether the condition is acute, chronic follicular, or gonorrheal. Both eyelids of every child should be everted and inspected for the presence of trachoma.

Nasal defects.—These include obstruction due to chronic nasal catarrh, deflected septum, polypi, or nasal spurs. The presence of adenoids should be suspected in all habitual mouth breathers.

Throat affections.—It should be stated in each case whether or not the tonsils are simply enlarged, or diseased and require surgical treatment. The condition of the palate should be noted, whether cleft or perforated.

Blood and intestinal parasites should be looked for in suspected cases. Routine examinations of this character are made only in endemic centers.

Nutrition.—The nutrition of the child should be recorded as "Excellent," "Good," "Fair," "Poor," or "Very poor." by placing a check (√) after the proper word. In order to eliminate the personal equation of the individual examiner as much as possible in estimating the nutrition of the particular child, due attention must be paid to the proper correlation between height and weight, color of the mucous membranes, the presence of subcutaneous fat, the muscular tone, and the general mental and physical state of the child.

Mental age may be determined by the use of the Binet-Simon scale for measuring intelligence, by the Yerkes-Bridgeman point scale, or by any other accepted scale. These tests should never be employed for the purpose of diagnosing feeble-mindedness by one without biologic and psychiatric training. It is not expected, therefore, that medical inspectors shall make routine examinations of this character unless specially qualified for such work.

INSTRUCTIONS FOR USE OF CHILD HYGIENE SURVEY CARDS.

INSTRUCTIONS FOR USE OF CHILD HYGIENE FORM NO. 7—SCHOOL CARD.

This card is designed for use in those schools which have no medical inspector or nursing service and is to be filled out by the teacher and the parent. Accordingly, it has been planned that the information desired on this school card is of such character as to be readily supplied from the usual school records and obtained by the teacher with but little additional effort.

The record of physical examination should be started by the teacher as soon as possible after the beginning of a school year, preferably during the first month. The child's sickness record during the session should be filled out at the end of *each school month.* The child's scholarship record can not be filled out until the *end of the session.*

The reverse side of the card, which is to be filled out by the parent or guardian, should be filled out immediately after the record of physical examination is made and before the other data are entered on the card.

In some instances it will be necessary for the teacher to assist the parent, especially the illiterate parent, in filling out the reverse side of a card. The teacher should be held responsible for having the information from the parent or guardian furnished in a complete and legible form.

To the Teacher.

Name of school.—Enter the name of the school, or if the school is known by a number, its number.

County and State.—Fill in the name of the county and the abbreviation for the State on *every* card.

Name of parent or guardian.—In case the person who fills out the reverse side of the card does not happen to be, for some special reason, the parent or guardian of the child, find out what the parent's or guardian's name is and enter on the space provided on the teacher's side of the card.

RECORD OF PHYSICAL EXAMINATION.

Height.—Always enter the height in inches and half inches (not feet and inches) and specify whether the measurement was made *with* or *without* shoes. If the height was measured *with* shoes, draw

a line through the word *without;* if *without* shoes, draw a line through the word *with.* The measurements taken at the end of the session should be made the same way as at the beginning, i. e., if the child is measured *without* shoes at the beginning he should be measured *without* shoes at the end.

Weight.—Remove all wraps and heavy coats before weighing children. Specify, as directed under *height*, whether weight was taken *with* or *without* shoes; if height was measured *with* shoes also weigh the child *with* shoes, but if measured *without* shoes, then weigh the child *without* shoes. Be sure that this rule is followed each time the child is weighed, so the weights at the beginning and at the end of the session will be comparable. Record weights in terms of pounds and one-fourth pounds.

Each child should be measured and weighed twice—once at the beginning of the school year and again just before the end of the school year, preferably during the first and the last months of the school year.

Does child hear well?—If you have noticed that the child is "hard of hearing," answer "No"; otherwise answer "Yes."

Does child see well?—If you have noticed that the child can not see the blackboard well, or holds his or her book in an unusual way, or there is any evidence that the child's sight is noticeably abnormal, enter "Yes"; otherwise, "No."

Does child wear glasses?—Answer "Yes" or "No"; that is, if the child wears glasses at school.

Number of teeth decayed.—Bring the child near a window so that the light will fall into the mouth and count the number of teeth that appear to have cavities.

Is child habitual mouth breather?—If the child ordinarily (that is, when it does not have a cold) holds its mouth open or seems to have difficulty in breathing through its nose, snuffs or sniffles, enter "Yes."

Other defects or deformities.—Specify any physical defect or deformity which is noticeable in the child. If of the leg, arm, or hand, specify whether it is the right or left.

Enter the date on which the above information was secured.

CHILD'S SICKNESS RECORD DURING SESSION.

This record is designed to show how much the child's attendance at school was cut down on account of sickness and other causes. For this reason it is necessary to know how many days each month the child was *enrolled*, i. e., how many days the child could have attended school had it not been absent for some particular cause.

Number of days enrolled.—By "Number of days enrolled" is meant the total number of school days during the current month or

which the child should have been present had it not been absent for sickness or any other cause. "Number of days enrolled" is not equivalent to "Number of days belonged" as this expression is commonly understood in school reports. That is, in some school systems it is the custom to drop a child's name from the roll after the third day of continuous absence, so that in a school month of 20 days, for example, a pupil absent for any reason for five consecutive days is counted as belonging for only three of the five days, and in the record of attendance for the entire month is counted as belonging only for 18 days. In making up the "Number of days enrolled," therefore, for a given pupil, no days should be dropped from the record in case of absence for any cause except permanent withdrawal from school. In this way the record as finally made up will include both *total* number of days present and *total* number of days actually absent. Enter for each month the number of days the child was actually "enrolled." For example, if John did not enter school until February 15, he should not be counted as enrolled for the entire month of February but only for that number of school days in February after February 14. In like manner, if John quit school at the close of March 10 he should be counted as enrolled for the number of school days from February 15 to the end of February and from March 1 to March 10, inclusive.

Number of days present.—Enter for each month the number of days the child was actually present at school. The number of days present plus the number of days absent from all causes should in all cases equal the number of days "enrolled;" i. e., absence from toothache plus absence from colds plus absence from other sickness plus absence from other causes plus days present should always equal "days" enrolled.

Number of days absent—Toothache.—Enter the number of days the child was absent because of toothache.

Number of days absent—Colds.—It is desirable to know the loss in school attendance caused by "common colds." If the child's absence is due to sickness and it is ascertained that the sickness was a cold, enter on this line the number of days lost on account of colds. It is important to bear in mind that a child might be sick and absent from school for other sickness than colds or for causes other than sickness in the same period of absence. In each case the absence should be divided up and entered under the proper causes, the total days absent from the various causes always equaling the total absence for the period.

Number of days absent—Other sickness.—Enter the number of days the child was absent on account of any other sickness, irrespective of the nature of the illness. Information for this and

similar entries can be ascertained by questioning the child upon his return to school after an absence or from written excuses sent by the parent. If there is reason to believe these written excuses sent by the parent are not correct, it is advisable to make as correct an entry as possible from any other sources of information which you may happen to have.

Number of days absent—Other causes.—This includes all causes other than those enumerated on the card; i. e., other than toothache, colds, and other sickness. Accidents should be included in "*Other causes*" and *not* in "*Other sickness.*"

Diseases during the present session.—If the child has any of the diseases named on the card during the session for which this record is kept, enter in the blank after the name of the disease the month in which the child had the disease in question; if the child did not have any of the diseases named, be certain to enter "No" for each disease it did not have. If there are any other diseases than those named, especially rheumatic fever, chorea (St. Vitus's dance), and malaria, which caused absence on the part of the child during this session, state what disease it was and the month in which it occurred.

CHILD'S SCHOLARSHIP RECORD.

This record should not be filled out until the end of the present session.

Age at which the child commenced school.—This information can be readily ascertained from the child itself.

Grades repeated by child prior to this session.—If a grade is repeated more than once, this should be stated. For example, John is now in the fourth grade, had to repeat the second grade once, and the third grade twice, the answer would be, second [1], third [2].

Grade in which the child is enrolled this session., i. e., grade in which it is enrolled during the session for which this record is kept.

Character of child's work at school during the present session.—Place a check (√) for "Excellent," or "Good," or "Fair," etc., according to your opinion of the child's school work or according to the report which you have made for the child.

Promoted or failed at the end of this session.—Enter "Promoted" or "Failed," as the case may be.

Causes of failure.—If the child failed to be promoted at this session, state what, in your opinion, were the causes of his failure. It is quite possible, of course, that his work was unsatisfactory because he was absent from school, because he was in poor health, or for other reasons than sickness, or because he is naturally dull, or because he is too fond of play and did not apply himself to his studies,

or because of other reasons. It is desired to have your own frank opinion of what was the cause of failure, if the child was not promoted.

At the bottom of the card, enter the dates this record was begun and ended, and sign your name.

REVERSE SIDE OF THE CARD.

You are requested to see that every blank space on the reverse side of the card is filled out by the parent or guardian. It is important that the reverse side of the card be filled out as near the beginning of the session as possible, and before you make his entries as to the school attendance, sickness, and scholarship record. This will avoid embarrassment.

INSTRUCTIONS FOR USE OF CHILD HYGIENE SURVEY CARDS.

INSTRUCTIONS FOR USE OF CHILD HYGIENE FORM NO. 8.—FAMILY SCHEDULE.

The family schedule is intended to be the means of recording certain general information about the family and home conditions of the children, for which special information is to be collected on separate schedules or cards, and relating to the mothers of the children.

The family schedule is designed to be used also as a folder 10 by 8 inches (5 by 8 inches folded), printed on durable manila paper, in which should be filed the individual, prenatal, infant welfare, preschool, and school cards (each 5 by 8 inches) for each child in the family. The school card will be kept, of necessity, by the teacher until the end of the session. When the school session is ended, the cards may be distributed in the respective folders for the families of which the children are members. Each family folder, therefore, will contain all the information collected for the children and other members of the family. The folder will also serve as a convenient means of filing any records or other memoranda which the worker or nurse wishes to keep during the period.

A space is provided at the bottom of the page, under the heading "Notes," for any explanatory footnotes that may be necessary. It is desirable that footnotes should be made as concise and brief as possible and that each footnote should have a reference to the specific entry to which it relates. If it is desired to make additional comment on any exceptional conditions found in a household, the comment may be made on a blank paper or card and put into the family folder.

All entries should be made in ink.

EXPLANATION OF ENTRIES.

Name.—Enter the surname of the head of the family and given name and initial immediately following, on the tab.

Address.—Enter street and number, if in town or city; enter the name of the city or township or the school district and the State. Caution should be exercised not to use abbreviations more than is necessary. The State, of course, can be abbreviated.

Length of residence.—Enter in years if over one year, and in months if under one year, the length of time this family has resided

in the locality, i. e., in the city, township, or district, in a particular house.

Preceding residence.—Place a check (√) after the word "Town" if the family's immediately preceding residence has not been on a farm; otherwise place a check (√) after the word "Country."

Number of moves in last two years.—Enter the number of times the family has moved from house to house during the past two years.

HOUSEHOLD CENSUS AND FAMILY INCOME.

Make an entry for each member of the family who is actually living at home, excluding boarders and lodgers who are not members of the immediate family. Enter under "Notes" at bottom of card the name, sex, and date of birth of children of the living mother who do not live at this home.

Name.—Enter surname first and then given name or initial; enter the name of the father or other head of the household first; then name of mother; then children in order of age and other members. Ditto marks can be used for surnames when the surname immediately preceding is the same.

Sex.—Enter "M." or "F."

Age at last birthday.—If 2 years or more, enter the age in years; if less than 2 years, enter age in months; if less than 2 months, enter in weeks; if less than 1 week, enter in days.

Relationship to head of family.—Opposite the name of the father or other person who may be the head of the family enter "H. H." (household head), and opposite the other names enter wife, son, daughter, son-in-law, daughter-in-law, niece, nephew, etc., as the case may be. In some cases the head of the family *actually* may be a son or some one other than the father or mother. For the sake of keeping the records straight, however, it is advisable to enter the name of the father, or the mother if the father is dead, as the head, and express the relationship of the other members of the family to him or her.

Defective, crippled, school attendance.—For any member of the family enumerated who is known to be mentally defective enter "D." Be sure to note in footnote any defective members of the family in asylums or who do not live at home. For any member of the family enumerated who is crippled, enter "C," and indicate in footnote briefly the nature of the defect. For all children attending school enter "S."

Other records.—Enter opposite the names of any members of the family for which other records may have been secured the following: "Inf." (infant), "PN." (prenatal), "S." (school), "PS." (preschool), Ind. (individual).

Usual amount of milk daily.—For children of school and preschool age make the inquiry as to the amount of fresh milk (sweet or buttermilk) each consumes daily. If this can be expressed in pints or quarts, make the entry in this form if possible; if the answer is in terms of a "glassfull" or a "cupful," attempt to state this in terms of pints or quarts if feasible.

Earnings in last two months.—This entry is to be filled in for *each* member of the family living at home who is engaged in a gainful occupation and who contributes to the support of the family in any other way than as a boarder or lodger. The inquiry as to income should be made with considerable care. Usually it is possible to ascertain what is the daily, weekly, or monthly wage or salary of each member when employed, and after allowing for time lost on account of sickness or other reasons, to approximate the amount actually earned during the two months preceding the date of inquiry. The purpose of this inquiry is to ascertain what the economic status of the family is, and the two months is selected because it is short enough to secure fairly accurate information and yet long enough to eliminate most of the unusual causes affecting earnings. If the two months' period is for any reason exceptional, care should be taken to eliminate the exceptional conditions, and a note should be entered to this effect at the bottom of the schedule.

Receipts from boarders and lodgers.—Enter the total amount actually received from boarders and lodgers during the period for which information as to earnings is secured. Specify whether the receipts are from boarders or from lodgers by drawing a line through the word not applicable. If a son or a daughter or any member of a family is strictly a boarder or lodger or both, his earnings should not be entered in the column for earnings, but should be entered as if he or she were an outsider living in the family. Enter the number of lodgers now staying with the family. Boarders should not be included unless they are also lodgers with the family.

All other family income.—Enter here all other *usual* family income in last two months.

N. B.—The space under "Estimated family income" is not to be filled in by the investigator, but is reserved for use in tabulation.

PARENTS OF CHILDREN AT HOME.

The entries under this general heading are to be made for both parents of the children who may be living in the family at the present time. In some cases there will be found stepchildren or others who are not children of either the mother or the father, e. g., nieces or nephews. Accordingly, two spaces have been left for the father

and two for the mother, e. g., if name No. 3 in the household census is a child of the father at home, but is also the child of his first wife, the information should be entered for his dead mother. Similarly, No. 5 may be the child of the same father but of a different mother (the second wife). For convenience the parentage of each child in the family can be recorded by simply placing the child's number in the census column after the father and mother, e. g., "Father of Nos. 4 and 5," "Father of Nos. 5 and 6," "Mother of Nos. 4, 5, and 6."

Country of birth.—Enter for each parent the country in which he or she was born. Make this as specific as possible.

Race.—Enter Chinese, Irish, Negro, Indian, Hebrew, French, etc.

Color.—Specify white or colored.

Occupation.—Make this answer as specific as possible, e. g., laborer in steel mill, zinc miner, brakeman, etc.

Education.—Specify, does not read, reads, reads and writes, common school, high school, normal school, college, etc. For example, "Sixth-grade common school," "Third-year high school," "College graduate."

Cause of death.—This answer should be made as definite as possible. The inquiry should be made as to what the attending physician said was the cause of death.

Mother.—These entries should be made only for the mother who is now living at home.

Number of living children.—Total number of children alive, whether they live at home or not.

Number of children born alive at full term.—This entry should be for all children who were born *alive* at *full term*, regardless of the fact that any one of them may have died shortly after birth. In other words, this should include all *live* births and be exclusive of all stillbirths and of all children born less than at full term.

Number of children born dead at full term.—All stillbirths but *exclusive* of children born dead at less than full term.

Number of children born before full term.—Enter in the proper space the number of children born alive and the number born dead. Note that these children are not to be included among children born at full term.

Is mother now pregnant?—Enter "Yes" or "No" and the number of months since conception.

Total number of pregnancies of this mother.—This should be the sum of all children born alive or dead at or before full term, miscarriages, abortions, and the present pregnancy. Specify multiple births (twins, etc.).

Home.—Place check (√) after house or apartment. State the number of rooms occupied by *this* household, *including* lodgers.

Yard or other outdoor play space.—This should be a statement of the outdoor space the children have to play in, but should not include the street. If there is a playground or vacant lot next door, this fact should be noted.

General appearance of home.—The investigator may enter here his or her impression as to the appearance of the home, e. g., as to whether it is well kept, neat, clean, etc.

Privy.—State whether open back, fly proof, or other type.

HOUSEHOLD MILK SUPPLY.

Place a check (√) after the question "Own cow" or "Buy milk," as the case may be. State as accurately as possible the number of quarts consumed daily by the family. If family owns a cow and sells or gives away milk, the milk thus disposed of should not be included in the amount consumed.

RECORD OF ILLNESS IN FAMILY WHILE UNDER OBSERVATION.

This record is a continuous record and should be made by the permanent district workers and nurses for all families which they visit in the course of their prenatal and infant and preschool work. It is not to be filled out in the course of the preliminary survey. It is not intended to be filled out for families for which no prenatal or infant and preschool cards are made. Record should be made of the sickness of all members of the family who are living at home.

Date of onset.—The date of onset is usually considered as the day on which the patient first observed the symptoms which are clearly connected with his or her present sickness. For the purpose of this card, however, the date of onset should be considered as the day on which the patient is unable to engage in his usual work or occupation.

Duration in days.—Enter the number of days of sickness. Care should be taken in cases where the person is inclined to be "ailing" or "complaining" all the time to get the actual number of days of this illness. The number of days sick should be considered as the total number of days lost from work or other pursuits.

Termination.—Enter "Recovered," "Death," "Chronic," or other results and date. It is desired to show under this heading the number of days lost from school or work. Consequently, in making entry under "Recovered," this should be considered the date on which a man is able to return to work, or a woman to resume her household duties or other occupation, or, in the case of a child, the date on which he returned to school or resumed play out of doors.

INSTRUCTIONS FOR USE OF CHILD HYGIENE SURVEY CARDS.

INSTRUCTIONS FOR USE OF CHILD HYGIENE FORM NO. 9.—INDIVIDUAL CHILD'S CARD.

The individual child's card should be filled out at the same time the family card is made. It is a part of the survey record. A card should be filled out as completely as possible for every child regardless of its age, which is living in the family at home and for all children born to the family but now dead, including all abortions and miscarriages.

The size of the card is 5 by 8 inches and should be filed in the family folder. Care should be taken to see that the entries as to name, color, sex, age, and locality are *identical* on the family card and on the individual child's card.

Child's surname and given name.—Enter surname first and given name or names next. (See instructions given below under "Born dead," for abortions and miscarriages.)

Name of family head.—Be sure that name of the family head on this card is the same as the name of the family head on the family card.

City, township, district, and State.—Make same entry as on the family card.

Name of child's father, _____; of child's mother _____ For example, if the child is a stepchild of either father or mother now living in the family, enter for this child the names of its *own* parents, not of its step-parents.

Born.—Enter year of birth and birthday.

Alive now.—Place a check (√) if the child is now living; if it is not living, enter "No."

PRENATAL.

The first two questions should be answered in figures; unabbreviated, they read as follows:

How many months before birth of this child did mother see a physician?

How many months before birth of this child did mother have an examination by a physician?

Was urinalysis made during the pregnancy preceding the birth of this child? Answer yes or no and state how often.

Condition during pregnancy—Mental.—Question the mother regarding whether or not she suffered nervous breakdown, and apprehension regarding the outcome of childbirth.

Condition during pregnancy—Physical.—Inquire regarding the mother's state of nutrition during this pregnancy, and whether she was "run down," "feeling bad," or suffered from intercurrent disease. If "run down," ask her whether or not this was due to overwork or to intercurrent sickness.

DELIVERY.

Place a check (√) after "Phys." (physician), "Midw." (midwife), or "Other Att'd" (other attendant), as the case may have been.

Hours in labor.—Enter the number of hours the mother was in labor before the birth of this child, and place a check (√) after "Easy," "Mod.," "Diffc.," as the case may have been. If *forceps were used* in delivery, enter "Yes"; if *forceps were not used*, enter "No."

AT BIRTH.

Full term.—Enter "Yes" or "No."

If not full term, what month?—Enter the month of pregnancy in which the child was born.

Born alive.—This should include all children born alive, whether at full term or not. If at full term, enter the initials "F. T."; if born alive before full term, enter according to months of pregnancy, as seventh month "7th Mo."

Born dead.—Enter here all children born dead, whether at full term or not, stating the month of pregnancy the birth took place. In addition to other uses, Form No. 9 is designed to show the interval between pregnancies. Obviously children born dead remain unnamed. However, an individual card should be made out in the case of each abortion, miscarriage, or stillbirth, writing in the family name in the upper left-hand corner and substituting the month in which the pregnancy terminated for the given name of the child. For example, a miscarriage occurring in the family of Smith would be entered as "Smith, 7th Mo." Check (√) abortions and miscarriages as born dead.

Weight at birth.—Enter in pounds and ounces.

Condition at birth.—If child was a healthy normal child, enter "Good"; if puny or abnormal in any way, make a definite entry.

Eyes treated.—Enter "Yes" or "No," if drops were put into infant's eyes immediately or shortly after birth.

FEEDING.

Number of months this child was breast fed exclusively.—Enter here the total number of months the child was breast fed *without any other feeding whatsoever.*

IF NOW LIVING.

Is child at school?—Enter "Yes" or "No" and the name or number of the school and the grade the child is in at the present session. If the child is not at school but is employed for wages, enter the occupation in as definite terms as possible and indicate how long the child has been employed.

DEATH.

In case the child was born alive but died before the present date, enter the exact date of its death. If the child was *born dead* make *no* entry under this heading.

Age at death.—Follow the same rule as that given above for "*Age now.*"

Cause of death.—Attempt to elicit from the mother or other responsible informant the physician's statement of the cause.

Mother's explanation of death.—Here enter any explanation the mother may have of the cause of the child's death. This information may throw light on circumstances connected with the child's health before death as well as afford information as to the mother's own ideas as to the cause of her child's death. The mother's explanation should be entered, so far as possible, just as she gives it.

BIRTH REGISTRATION.

Has this child's birth been registered?—Answer "Yes" or "No," and give birthplace.

INSTRUCTIONS FOR USE OF CHILD HYGIENE SURVEY CARDS.

INSTRUCTIONS FOR USE OF CHILD HYGIENE FORM NO. 10—PRENATAL CARE.

This card is intended for use by the permanent worker and should be filled out for every pregnant mother.

Data relating to the family will have been entered on the family schedule (Form 8).

Care should be taken to make all entries relating to the name of the mother, family head, address, and age identical with that on the family card. If it is found that any of these items have been entered incorrectly, special inquiry should be made and the proper corrections inserted on the family card.

The card should be filed in the family schedule folder.

Name of family head.—Be sure that this is identical with the name of the family head on the family card.

Address.—Be sure that this is the same as on the other cards relating to this family. If, for any reason, the family has moved since the family card was made out, then notations should be made on that and other cards for this family.

Date first visit.—Enter the date on which the first visit to this mother has been made for the purpose of securing prenatal information.

Case No.—Number all cases serially during each calendar year.

Age.—Enter age nearest last birthday.

M., W., S. (*married, widowed, or single*).—Place check (√) in the proper space.

Number this pregnancy.—Enter the number which this pregnancy is of the total number of pregnancies of this mother, including all children who are born alive or dead, whether at or before full term, miscarriages, and abortions. It is important that the number of pregnancies of this mother as ascertained for the prenatal card should correspond to the total number of pregnancies for this mother on the family card. If the entries do not correspond, careful inquiry should be made and the family card corrected.

Age first menstr.—Age in years at which first menstruation occurred.

Date last menstr.—Enter the exact date on which the last menstruation occurred prior to this pregnancy. This information is

useful as a basis of calculation of the probable date of confinement. The general rule is that the delivery may be expected within from 270 to 280 days from the appearance of the last menstruation or 275 days from the date of its cessation. If one counts back three months from the date of cessation of the last previous menstruation and adds seven days, this will give the approximate date of the expected delivery.

Date of quickening.—Enter the date as accurately as possible. Quickening is first noticed on an average about the middle of the fourth month of pregnancy. However, the statement of the mother in respect of this is not always reliable. The date on which quickening is first observed is useful for determining the approximate date of the expected confinement, but only in those cases in which conception took place during a nursing period, when the menses were arrested.

Duration present pregnancy.—Enter the number of months since the last menstruation occurred.

Date expected confinement.—Naturally this should be calculated as closely as possible in order that the mother may be instructed to take the proper steps both from the standpoint of herself and expected child.

Nutrition.—Place a check (√) in the proper space.

PREVIOUS HISTORY OF SICKNESS.

Careful inquiry should be made from the mother as to whether or not she has suffered from the diseases mentioned on the card, the age at which she was affected, and whether active at the present time. For example, this could be indicated as follows: 25 years actv. or 25 years recv. This knowledge will be very useful to the physician and nurse to enable them properly to advise the mother as to the necessary remedial measures.

The term "Wassermann" is purposely used instead of the word "syphilis." When possible to do so, careful inquiry should be made of any symptoms of syphilitic infection and as to whether or not the disease is active. In case of uncertainty a Wassermann test is desirable. Effort should be made to secure proper treatment in any infectious case. If possible, information should be sought from the physician in cases where suspicious symptoms are noticed and it is deemed undesirable to make inquiry of the expectant mother.

In respect of mental disturbances at previous pregnancies or confinements, inquiry should be made as to apprehension on the part of the mother of the outcome of or attitude toward childbearing and whether or not she had had at any time any mental breakdown that might definitely be associated with pregnancy or recovery from

childbirth. This information will be useful in case she had so suffered previously in order that due precautions may be taken.

Present pregnancy.—Notations should be made after each symptom of the week of the pregnancy the symptom is manifest. Special attention should be paid to disturbed vision and œdemia and shortness of breath in relation to the presence of albumen in urine with a view to preventing eclampsia. Furthermore, the significance of bleeding in the early months of pregnancy may indicate an entirely distinct condition from bleeding at a later period.

The presence of vaginal discharge will suggest the possibility of venereal infection and calls for microscopic examination. There should be no possible excuse for failure to treat the baby's eyes immediately after birth.

PHYSICIAN'S EXAMINATION.

The physician should be requested to fill in data for the first examination he made of this expectant mother and for the last examination prior to confinement. The data of each examination should be entered in each case, and the entries should be made by the physician as concisely as possible. The condition of the nipple should be carefully recorded in order that the breast and nipple may be placed in the best condition for nursing the baby. Special care should be given to the breast and nipples of mothers pregnant for the first time. The interest displayed by the physician and nurse in the condition of the breast and nipple will do much toward impressing the mother with the importance of breast feeding.

CONFINEMENT.

Date.—Enter the date on which the child is born.

Phys., midw., oth.—Place a check (√) in the proper space.

Duration of labor.—Enter the number of hours in which the mother was in labor.

Instruments.—Enter "Yes" or "No."

Why.—If instruments were used, state reason.

Presentation.—Obtain information from attending physician and note on card.

Peritonœum torn.—Obtain information from attending physician, and note, if possible, the degree of tear.

Repaired.—Note whether this has been done or not, and if successful.

HISTORY OF CHILD.

Delivery at full term.—Enter "Yes" or "No." If not full term, at which month of pregnancy.

Miscarriage, alive, dead.—Place check (√) in the proper space. State month.

Abortion.—State month and assigned cause.

Sex (of child).—Place a check (√) in the proper space.

Weight at birth.—In pounds and ounces.

Eyes treated.—Enter "No" if eyes were not treated; if eyes were treated, enter the nature of the treatment given.

Birth certificate filed.—Enter "Yes" or "No" and date.

ONE MONTH AFTER BIRTH.

Weight in pounds and ounces.

Feeding.—If child at one month after birth is breast fed exclusively, place a check (√) mark after "Breast." If it is breast fed and also receives other food, put a check (√) mark after "Mixed." If it is not breast fed at all, but is exclusively fed on artificial diet, place a check (√) mark after "Artificial." In case child is fed any artificial food, the character of the food should be stated.

Eyes infected.—Enter "Yes" or "No."

When.—State whether the eyes were infected at birth or at a later period.

Condition of umbilicus.—Note whether entirely healed and tendency to development of umbilical hernia.

Encouragement of maternal nursing.—State whether or not the mother is willing to nurse her baby and note any conditions making this impossible or inadvisable. A scant milk supply can be improved by "stripping" the breast of all remaining milk after each feeding. This should be a routine practice in all cases where at first the mother does not produce enough milk.

Record of prenatal care.—So far as possible, entry should be made in each column at each visit made. When possible, visits should be made every three or four weeks up to the fifth month of pregnancy, and thereafter every 10 days until delivery. The exact date of visit should be entered, whether or not the visit was made to the home of the mother or clinic or child-welfare station.

RECORD OF CARE DURING PUERPERIUM.

The same care should be observed in making entries in the proper column as in the record of prenatal care. The nurse should visit the patient every two days for one week immediately following confinement, and thereafter every five days for a period of at least one month.

INSTRUCTIONS FOR USE OF CHILD HYGIENE SURVEY CARD.

CHILD HYGIENE FORM NO. 11—INFANT AND PRESCHOOL CARD.

This card is intended for use by the permanent worker and should be filled out for every child under school age. The pink card is to be used for infants (under 1 year old), and the buff card for other children.

Data relating to the family, the mother, and to prenatal and conditions at birth of the child will have been entered on the family schedule (Form 8) and individual child card (Form 9).

This card should be filed in the family schedule.

Name of family head.—Be sure that this is identical with the name of the family head on the family card.

Name of child's father, ————; *of child's mother*, ————.—For example, if the child is a stepchild, the names of *both* of its *own* parents should be entered.

Born.—Enter the year of birth and the birth date.

Age at this date.—For child of 2 years of age or over, enter age in years and months; for child under 2 years of age, but over 2 months, enter age in months; for child under 2 months in age, enter in weeks, unless the child is less than 1 week old, in which case enter age in days.

FEEDING PRIOR TO THIS DATE.

Feeding of the child *prior* to the date on which this record was begun.

These questions relate to the infancy of the child, and they should be answered for all infants for whom this record is made. By "Mixed feeding" is meant breast feeding with other foods (in bottle or otherwise) in the diet at the same time. Space on the reverse of the card is provided for recording the diet of the child while it is under observation.

PREVIOUS ILLNESS.

Enter the age at which the child had any of the diseases specified; be careful to enter child's age in the same way as explained in the instructions for "Age at this date." For "Influenza" make entry only for influenza occurring in the period September 17, 1918–April 1, 1919. If child did not have influenza in this period, enter "No."

VACCINATION.

Enter "Yes" or "No," and the date as nearly as it can be ascertained when the last successful vaccination occurred. If it is not practicable to get the date exactly, it is often possible to ascertain the age at which the child was last successfully vaccinated. For "Diphtheria," antitoxin is *not* meant; but entry should be made as to whether or not active immunization was secured by the administration of toxin-antitoxin.

PHYSICAL INSPECTION.

Nutrition.—Enter check (√) mark after the term applicable.

Teeth.—In case of infants, state whether dentition is normal or delayed.

In case of older children, note condition of the teeth from the standpoint of dental prophylaxis, use of toothbrush, and number of decayed teeth.

The teeth usually first appear between the third and tenth months, normally about the seventh or eighth month. Rachitic children usually teeth very early or very late. Premature dentition is often seen in syphilitic children. The milk teeth are 20 in number and usually appear in the following order:

19	11	13	5	3	4	6	14	9	17
20	12	15	7	1	2	8	16	10	18

The two lower incisors appear on the average about the seventh month, the four upper incisors from the ninth to sixteenth month, the two lateral lower incisors and four anterior molars from the thirteenth to seventeenth month, four canines from the sixteenth to twenty-first month. All of the temporary teeth appear, on an average, by the twenty-fourth to the thirtieth month.

Nose and throat.—Enter "Yes" or "No" in answer to each of the specified questions.

Evidence of disease.—Note particularly any evidence of the disease mentioned as well as other diseases.

Defects or deformities.—Note mental defects and physical deformities. Note especially defects or deformities traceable to injuries at birth.

Weight.—Infants should be weighed always without clothes. Specify *with* or *without* clothes in the case of children of preschool age.

RECORD OF VISITS—CLINIC OR HOME.

The reverse of the card is intended to be used for a current record of the visits made by the permanent worker in the home of the child, or of the child to the infant-welfare station or clinic. Care should

be taken in filling out this record to enter the exact date on which the visit is made, and, especially for infants, the exact age at which the record was made. (See instructions for "Age at this date.")

In the third column entries should be made as to whether the visit was to the infant-welfare station or clinic or at the home. If the former, enter "C."; if the latter, enter "H."

The weight at the date of visit should be entered in the fourth column. Infants (under 1 year) should be weighed every week; children of preschool age, every three months.

Under the head of "Feeding," the answer should be as brief but exact as possible, so that changes in feeding as they occur can be noted. This question is important not only for the purpose of ascertaining what the child's diet is at any given time, but to afford information as to changes in the child's diet in relation to changes in its weight and its physical condition.

Under the head of "Notes," care should be taken to indicate the condition of the child and to note any illness and the nature of such illness. All illnesses should *also* be entered on the space provided on the reverse of the family schedule (Card Form No. 8).

614
Un3m

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 24

UNIVERSITY OF ILLINOIS
1920

The Control of Communicable Diseases

REPORT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION COMMITTEE ON STANDARD REGULATIONS APPOINTED IN OCTOBER, 1916

614.09
Un3m
no.24

▽

(Pocket edition of Reprint No. 436 from Public Health Reports)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 24

The Control of Communicable Diseases

REPORT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION COMMITTEE ON STANDARD REGULATIONS APPOINTED IN OCTOBER, 1916

(Vest pocket edition of Reprint No. 436 from Public Health Reports)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

FOREWORD.

REPORT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION COMMITTEE ON STANDARD REGULATIONS, APPOINTED IN OCTOBER, 1916.[1]

In the following report the terms used are first defined. Each disease is briefly described with regard to the infective agent, the source of infection, the mode of transmission, the incubation period, and the period of communicability. Following this are given the methods of control—first, those affecting the individual patient and his immediate environment, and second, general measures bearing upon the control or prevention of the disease in question.

Inasmuch as the laws under which various boards and departments of health operate require differences in the legal phraseology of rules, regulations, or sections of sanitary codes dealing with the control of communicable diseases the committee has refrained from preparing formal regulations under each disease. As the report is at present submitted, any health officer, board of health, or legislative body having the power to make rules or regulations or pass sections of sanitary codes dealing with the control of communicable diseases can, by reference to the description of the disease and recommendations for methods of control herewith proposed, easily prepare the necessary text upon which the educational and administrative acts of the health officer will be based. The list of diseases considered by the committee and herewith reported upon includes those given in the Public Health Reports, Vol. 30, No. 27, July 2, 1915, of the Public Health Service in "A Model State Law for Morbidity Reports."

The committee is indebted for expert opinion and critical comment upon its tentative conclusions to Dr. Simon Flexner, Dr. William H. Park, Prof. Theobald Smith, and Dr. Bertram H. Waters, and acknowledgment of their contributions to the report in its present form is herewith gratefully expressed.

Dr. HAVEN EMERSON, *Chairman.*
ROBERT N. HOYT.
Dr. F. M. MEADER.
Dr. J. C. PERRY.
C.-E. A. WINSLOW.

---

[1] Reprint from the Public Health Reports, vol. 32, No. 41, Oct. 12, 1917, pp. 1706–1733.

614.09
Un3m
no.24

LIST OF DISEASES.

Actinomycosis.
Acute infectious conjunctivitis.
Anchylostomiasis (hookworm).
Anthrax.
Cerebrospinal meningitis (epidemic).
Chicken pox.
Cholera.
Dengue.
Diphtheria.
Dysentery (amebic).
Dysentery (bacillary).
Favus.
German measles.
Glanders.
Gonorrhea.
Leprosy.
Malaria.
Measles.
Mumps.
Paratyphoid fever.
Plague.
Pneumonia (acute lobar).
Poliomyelitis.
Rabies.
Rocky Mountain spotted or tick fever.
Scarlet fever.
Septic sore throat.
Smallpox.
Syphilis.
Tetanus.
Trachoma.
Trichinosis.
Tuberculosis (pulmonary).
Tuberculosis (other than pulmonary).
Typhoid fever.
Typhus fever.
Whooping cough.
Yellow fever.

The committee adopted the following definitions of terms

1. *Carrier.*—A person, who without symptoms of a communicable disease, harbors and disseminates the specific microorganisms.

2. *Cleaning.*—This term signifies the removal, by scrubbing and washing, of organic matter on which and in which bacteria may find favorable conditions for prolonging life and virulence; also the removal by the same means of bacteria adherent to surfaces.

3. *Contact.*—A "contact" is any person or animal known to have been sufficientiy near to an infected person or animal to have been exposed to transfer of infectious material directly, or by articles freshly soiled with such material.

4. *Delousing.*—By delousing is meant the process by which a person and his personal apparel are treated so that neither the adults nor the eggs of *Pediculus corporis* or *Pediculus capitis* survive.

5. *Disinfection.*—By this is meant the destroying of the vitality of pathogenic microorganisms by chemical or physical means.

When the word *concurrent* is used as qualifying disinfection it indicates the application of disinfection immediately after the discharge from the body of an infected person, of infectious material, or the soiling of articles with such infectious discharges.

When the word *terminal* is used as qualifying disinfection, it indicates the process of rendering the personal clothing and immediate physical environment of the patient free from the possibility of conveying the infection to others, at the time when the patient is no longer a source of infection.

6. *Education in personal cleanliness.*—By this phrase it is intended to include all the various means available to impress upon all members of the community, young and old, and especially when communicable disease is prevalent or during epidemics, by spoken and printed word, and by illustration and suggestion, the necessity of:

(1) Washing the body daily with soap and water.

(2) Washing hands in soap and water after voiding bowels or bladder and always before eating.

(3) Keeping hands and unclean articles, or articles which have been used for toilet purposes by others, away from mouth, nose, eyes, ears, and vagina.

(4) Avoiding the use of common or unclean eating, drinking, or toilet articles of any kind, such as towels, handkerchiefs, hair brushes, drinking cups, pipes, etc.

(5) Avoiding direct exposure to the spray from the noses and mouths of people who cough or sneeze, or laugh and talk loudly, with wide open mouth, or in explosive manner.

7. *Fumigation.*—By fumigation is meant a process by which the destruction of insects, as mosquitoes and body lice, and animals, as rats, is accomplished by the employment of gaseous agents.

8. *Isolation.*[2]—By isolation is meant the separating of persons suffering from a communicable disease, or carriers of the infecting organism, from other persons, in such places and under such conditions as will prevent the direct or indirect conveyance of the infectious agent to susceptible persons.

9. *Quarantine.*[2]—By quarantine is meant the limitation of freedom of movement of persons or animals who have been exposed to communicable disease for a period of time equal to the incubation period of the disease to which they have been exposed.

10. *Renovation.*—By renovation is meant, in addition to cleansing, such treatment of the walls, floors, and ceilings of rooms or houses as may be necessary to place the premises in a satisfactory sanitary condition.

11. *Report of a disease.*—By report of a disease is meant the notification to the health authorities, and, in the case of communicable disease in animals, also to the respective departments of agriculture, who have immediate jurisdiction, that a case of communicable disease exists in a specified person or animal at a given address.

12. *Susceptibles.*—A susceptible is a person or animal who is not known to have become immune to the particular communicable disease in question by natural or artificial process.

---

[2] In view of the various ambiguous and inaccurate uses to which the words isolation and quarantine are not infrequently put, it has seemed best to adopt arbitrarily the word isolation as describing the limitation put upon the movements of the known sick or "carrier" individual or animal, and the word quarantine the limitations put upon exposed or "contact" individuals or persons.

The items considered necessary for presentation by the committee with regard to each disease are the following:

1. Infective agent.
2. Source of infection.
3. Mode of transmission.
4. Incubation period.
5. Period of communicability.
6. Methods of control.
   (A) The infected individual and his environment:
      1. Recognition of the disease.
      2. Isolation.
      3. Immunization.
      4. Quarantine.
      5. Concurrent disinfection.
      6. Terminal disinfection.
   (B) General measures.
   (C) Epidemic measures (occasionally require separate mention).

Actinomycosis.

1. *Infective agent: Actinomyces bovis.*
2. *Source of infection:* The nasal and bowel discharges and the infected material from lesions in human and animal cases of the disease. Uncooked meat from infected animals may serve as a source of infection.
3. *Mode of transmission:* By contact with the discharges or with articles freshly soiled with the discharges from animal or human cases.
4. *Incubation period:* Unknown.
5. *Period of communicability:* As long as open lesions remain, as proved by the presence of the infective agent or microscopic or cultural tests.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by microscopic examination of discharges from the lesions.
      2. Isolation—None, provided the patient is under adequate medical supervision.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Of discharges from lesions and articles soiled therewith.
      6. Terminal disinfection—By thorough cleaning.
   (B) General measures—
      1. Inspection of meat, with condemnation of carcasses, or infected parts of carcasses, of infected animals,
      2. Destruction of known animal sources of infection.

Acute Infectious Conjunctivitis.

(Not including trachoma.)

(This title to replace the terms gonorrheal ophthalmia. ophthalmia neonatorum, and babies' sore eyes.)

1. *Infectious agent:* The gonococcus or some member of a group of pyogenic organisms, including the hemoglobinophilic bacilli.
2. *Source of infection:* Discharges from conjunctivæ, or adnexa, or genital mucous membranes of infected persons.

3. *Modes of transmission:* Contact with an infected person or with articles freshly soiled with discharges of such person.
4. *Incubation period:* Irregular, but usually 36 to 48 hours.
5. *Period of communicability:* During the course of the disease and until the discharges from the infected mucous membranes have ceased.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed where possible by bacteriological examination.
      2. Isolation—None, provided the patient is under adequate medical supervision.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Disinfection of conjunctival discharges and articles soiled therewith.
      6. Terminal disinfection—Thorough cleansing.
   (B) General measures—
      1. Enforcement of regulations forbidding the use of common towels and toilet articles. Education as to personal cleanliness.
      2. Use of silver nitrate or some similar solution in the eyes of the new born.

Anchylostomiasis.

(Hookworm.)

1. *Infectious agent.*—Anchylostoma (*Necator americanus*).
2. *Source of infection.*—Feces of infested persons. Infection generally takes place through the skin, occasionally by the mouth.
3. *Mode of transmission.*—The larval forms pierce the skin, usually of the foot, and passing through the lymphatics to the vena cava and the right heart, thence in the blood stream to the lungs, they pierce the capillary walls and pass into the alveoli. Then they pass up the bronchi and trachea to the throat, whence they are swallowed and finally lodge in the small intestine. Also by drinking water containing larvæ, by eating soiled food, by hand to mouth transmission of the eggs or larvæ from objects soiled with infected discharges.
4. *Incubation period.*—Seven to 10 weeks.
5. *Period of communicability.*—As long as the parasite or its ova are found in the bowel discharges of an infected individual. Contaminated soil remains infective for five months in the absence of freezing.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Microscopic examination of bowel discharges.
      2. Isolation—None.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Sanitary disposal of bowel discharges.
      6. Terminal disinfection—None.
      7. Treatment—Appropriate treatment of infected individual to rid the intestinal canal of the parasite and its ova.

6. *Methods of control*—Continued.
   (B) General measures—
      1. Education as to dangers of soil pollution.
      2. Prevention of soil pollution by installation of sanitary disposal systems for human discharges.
      3. Personal prophylaxis by cleanliness and the wearing of shoes.

Anthrax.

1. *Infectious agent.—Bacillus anthracis.*
2. *Source of infection.*—Hair, hides, flesh, and feces of infected animals.
3. *Mode of transmission.*—Inoculation as by accidental wound or scratch, inhalation of spores of the infectious agent, and ingestion of insufficiently cooked infected meat.
4. *Incubation period.*—Within seven days.
5. *Period of communicability.*—During the febrile stage of the disease and until lesions have ceased discharging. Infected hair and hides of infected animals may communicate the disease for many months after slaughter of the animal, and after curing of hide, fur, or hair, unless disinfected.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination.
      2. Isolation of the infected individual until the lesions have healed.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of the discharges from lesions and articles soiled therewith.
      6. Terminal disinfection—Thorough cleaning.
   (B) General measures—
      1. Animals ill with a disease presumably anthrax should be placed immediately in the care of a veterinary surgeon. Proved animal cases of the disease should be killed promptly and the carcasses destroyed, preferably by fire.
      2. Isolation of all animals affected with the disease.
      3. Immunization of exposed animals under direction of Federal or State Department of Agriculture.
      4. Post-mortem examinations should be made only by a veterinary surgeon, or in the presence of one.
      5. Milk from an infected animal should not be used during the febrile period.
      6. Control and disinfection of effluents and trade wastes and of areas of land polluted by such effluents and wastes from factories or premises, where spore-infected hides or other infected hide and hair products are known to have been worked up into manufactured articles.
      7. A physician should be constantly employed by every company handling raw hides, or such companies should operate under the direct supervision of a medical representative of the health department.
      8. Every employee handling raw hides, hair, or bristles who has an abrasion of the skin should immediately report to a physician.

6. *Methods of control*—Continued.
   (B) General measures—Continued.
   9. Special instruction should be given to all employees handling raw hides in regard to the necessity of personal cleanliness.
   10. Tanneries and woolen mills should be provided with proper ventilating apparatus so that dust can be promptly removed.
   11. Disinfection, before they are used or assorted, of hair, wool, and bristles of animals originating in known infected centers.
   12. The sale of hides from an animal infected with anthrax should be prohibited. A violation of this regulation should be immediately reported to the State commissioner of agriculture, by telegram, stating the time, place, and purchaser to whom the hide was sold. The report should also be sent to the person purchasing the hide. Carcasses should be disposed of under the supervision of the State department of agriculture. The inspection and disinfection of imported hides are under the supervision of the United States Bureau of Animal Industry. In the event that infection is introduced, the State agricultural authorities have jurisdiction over infected animals and the local or State health authorities have jurisdiction over infected persons.

Cerebrospinal Meningitis.

1. *Infective agent: Diplococcus intracellularis* (the meningococcus).
2. *Source of infection:* Discharges from the nose and mouth of infected persons. Clinically recovered cases, and healthy persons who have never had the disease but have been in contact with cases of the disease or other carriers, act as carriers and are commonly found, especially during epidemics. Such healthy carriers are not uncommonly found independent of epidemic prevalence of the disease.
3. *Mode of transmission:* By direct contact with infected persons and carriers, and indirectly by contact with articles freshly soiled with the nasal and mouth discharges of such persons.
4. *Incubation period:* Two or ten days, commonly seven. Occasionally for longer periods when a person is a carrier for a time before developing the disease.
5. *Period of communicability:* During the clinical course of the disease and until the specific organism is no longer present in the nasal and mouth discharges of the patient. The same applies to healthy carriers so far as it affects persistence of infectious discharges.
6. *Methods of control:*
   (A) The infected individual and his environment—
   1. Recognition of the disease—Clinical symptoms, confirmed by the microscopic and bacteriological examination of the spinal fluid, and by bacteriological examination of nasal and pharyngeal secretions.
   2. Isolation of infected persons and carriers until the nasopharynx is free from the infecting organism, or, at the earliest, until one week after the fever has subsided.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Con.
      3. Immunization may prove of value. Immunization by the use of vaccines still in the experimental stage.
      4. Quarantine—None.
      5. Concurrent disinfection of discharges from the nose and mouth and of articles soiled therewith.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Search for carriers among families and associates of recognized cases by bacteriological examination of posterior nares of all contacts.
      2. Education as to personal cleanliness and necessity of avoiding contact and droplet infection.
      3. Prevention of overcrowding, such as is common in living quarters, transportation conveyances, working places, and places of public assembly in the civilian population, and in inadequately ventilated closed quarters in barracks, camps, and ships among military units.

Chicken Pox.

1. *Infectious agent:* Unknown.
2. *Source of infection:* The infectious agent is presumably present in the lesions of the skin and of the mucous membranes; the latter appearing early and rupturing as soon as they appear, render the disease communicable early, that is, before the exanthem is in evidence.
3. *Mode of transmission:* Directly from person to person; indirectly through articles freshly soiled by discharges from an infected individual.
4. *Incubation period:* Two to three weeks.
5. *Period of communicability:* Until the primary scabs have disappeared from the mucous membranes and the skin.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. The differential diagnosis of this disease from smallpox is important, especially in people over 15 years of age.
      2. Isolation—Exclusion of patient from school, and prevention of contact with nonimmune persons.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of articles soiled by discharges from lesions.
      6. Terminal disinfection—Thorough cleaning.
   (B) General measures—None.

Cholera.

1. *Infectious agent: Vibrio cholerœ.*
2. *Source of infection:* Bowel discharges and vomitus of infected persons, and feces of convalescent or healthy carriers. Ten per cent of contacts may be found to be carriers.
3. *Mode of transmission:* By food and water polluted by infectious agent; by contact with infected persons, carriers, or articles freshly soiled by their discharges; by flies.
4. *Incubation period:* One to five, usually three, days, occasionally longer if the healthy-carrier stage, before development of symptoms, is included.

5. *Period of communicability:* Usually 7 to 14 days or longer and until the infectious organism is absent from the bowel discharges.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination.
      2. Isolation of patient in hospital or screened room.
      3. Immunization by vaccination may be of value.
      4. Quarantine—Contacts for five days from last exposure, or longer if stools are found to contain the cholera vibrio.
      5. Concurrent disinfection—Prompt and thorough disinfection of the stools and vomited matter. Articles used by and in connection with the patient must be disinfected before removal from the room. Food left by the patient should be burned.
      6. Terminal disinfection—Bodies of those dying from cholera should be cremated if practicable, or, otherwise, wrapped in a sheet wet with disinfectant solution and placed in water-tight caskets. The room in which a sick patient was isolated should be thoroughly cleaned and disinfected.
   (B) General measures—
      1. Rigid personal prophylaxis of attendants by scrupulous cleanliness, disinfection of hands each time after handling patient or touching articles contaminated by dejecta, the avoidance of eating or drinking anything in the room of the patient, and the prohibition of those attendant on the sick from entering the kitchen.
      2. The bacteriological examination of the stools of all contacts to determine carriers. Isolation of carriers.
      3. Water should be boiled, if used for drinking or toilet purposes, or if used in washing dishes or food containers, unless the water supply is adequately protected against contamination or is so treated, as by chlorination, that the cholera vibrio can not survive in it.
      4. Careful supervision of food and drink. Where cholera is prevalent, only cooked foods should be used. Food and drink after cooking or boiling should be protected against contamination, as by flies and human handling.
   (C) Epidemic measures—
      Inspection service for early detection and isolation of cases; examination of persons exposed in infected centers for detection of carriers, with isolation or control of carriers; disinfection of rooms occupied by the sick; and the detention, in suitable camps for five days, of those desirous of leaving for another locality. Those so detained should be examined for detection of carriers.

Dengue.

1. *Infectious agent:* Unknown.
2. *Source of infection:* The blood of infected persons.
3. *Mode of transmission:* By the bite of infected mosquitoes, probably *Aedes calopus* (perhaps also *Culex fatigans*).

4. *Incubation period:* Four to five days.
5. *Period of communicability:* During the febrile stage of the disease.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms.
      2. Isolation—The patient must be kept in a screened room.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—None. Upon termination of the case, fumigation of the room and house, to destroy mosquitoes.
   (B) General measures—
      Measures directed toward elimination of mosquitoes. Screening of rooms.

Diphtheria.

1. *Infectious agent: Bacillus diphtheriæ* (the Klebs-Loeffler bacillus).
2. *Source of infection:* Discharges from diphtheritic lesions of nose, throat, conjunctiva, vagina, and wound surfaces. Secretions from the nose and throat of carriers of the bacillus.
3. *Mode of transmission:* Directly by personal contact, indirectly by articles freshly soiled with discharges, or through infected milk or milk products.
4. *Incubation period:* Usually two to five days, occasionally longer if a healthy-carrier stage precedes the development of clinical symptoms.
5. *Period of communicability:* Until virulent bacilli have disdisappeared from the secretions and the lesions. The persistence of the bacilli after the lesions have healed is variable. In fully three-quarters of the cases they disappear within two weeks. In 95 per cent of cases the bacilli disappear in four weeks. In exceptional cases virulent bacilli remain in the throat and discharges for from two to six months.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms with confirmation by bacteriological examination of discharges.
      2. Isolation—Until two cultures from the throat and two from the nose, taken not less than 24 hours apart, fail to show the presence of diphtheria bacilli. Isolation may be terminated if persistent diphtheria bacilli prove avirulent. Where termination by culture is impracticable cases may be terminated with fair safety as a rule 16 days after onset of the disease.
      3. Immunization—Exposed susceptibles to be promptly immunized by antitoxin. (By susceptibles is meant such individuals as are found to be nonimmune by the Schick test, i. e., those who give a positive reaction.)
      4. Quarantine—All exposed persons until shown by bacteriological examination not to be carriers.
      5. Concurrent disinfection of all articles which have been in contact with the patient and all articles soiled by discharges from the patient.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Con
      6. Terminal disinfection—At the end of the illness, thorough airing and sunning of the sick room, with cleaning or renovation.
   (B) General measures—
      1. Pasteurization of milk supply.
      2. Application of the Schick test to all contacts, and immunization of all susceptibles.
      3. Application of the Schick test to all children.
      4. Immunization by toxin-antitoxin inoculation of all susceptibles.
      5. Determination of presence or absence of carriers among contacts, and, so far as practicable, in the community at large.

Dysentery (Amebic).

1. *Infectious agent: Amœba histolytica.*
2. *Source of infection:* The bowel discharges of infected persons.
3. *Mode of transmission:* By drinking contaminated water, and by eating infected foods, and by hand-to-mouth transfer of infected material; from objects soiled with discharges of an infected individual, or of a carrier; by flies.
4. *Incubation period:* Unknown.
5. *Period of communicability:* During course of disease and until repeated microscopic examination of stools shows absence of *Amœba histolytica.*
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms confirmed by microscopic examination of stools.
      2. Isolation—None.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of the bowel discharges.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Boil drinking water unless the supply is known to be free from contamination.
      2. Water supply should be protected against contamination and supervision should be exercised over all foods eaten raw.

Dysentery (Bacillary).

1. *Infectious agent: Bacillus dysenteriæ.*
2. *Source of infection:* The bowel discharges of infected persons.
3. *Mode of transmission:* By drinking contaminated water, and by eating infected foods, and by hand-to-mouth transfer of infected material; from objects soiled with discharges of an infected individual, or of a carrier; by flies.
4. *Incubation period:* Two to seven days.
5. *Period of communicability:* During the febrile period of the disease and until the organism is absent from the bowel discharges.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by serological and bacteriological tests.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Con.
      2. Isolation—Infected individuals during the communicable period of the disease.
      3. Immunization—Vaccines give considerable immunity. Owing to severe reactions their use is not universal, nor should it be made compulsory except under extreme emergency.
      4. Quarantine—None.
      5. Concurrent disinfection—Bowel discharges.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Rigid personal prophylaxis of attendants upon infected persons.
      2. No milk or food for human consumption should be sold from a place occupied by a patient unless the persons engaged therein occupy quarters separate from the house where the patient is sick, and all utensils used are cleaned and kept in a separate building, and under a permit from the health officer.
      3. All attendants upon persons affected with this disease should be prohibited from having anything to do with the handling of food.
      4. Necessary precautions against flies.

Favus.

1. *Infectious agent: Achorion schoenleinii.*
2. *Source of infection:* Lesions of skin, particularly on scalp.
3. *Mode of transmission:* Direct contact with patient, and indirectly through toilet articles.
4. *Incubation period:* Unknown.
5. *Period of communicability:* Until skin and scalp lesions are all healed.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms confirmed by microscopic examination of crusts.
      2. Isolation—Exclusion of patient from school and other public places until lesions are healed.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Toilet articles of patient.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Elimination of common utensils, such as hair brushes and combs.
      2. Provision for adequate and intensive treatment and cure of cases of favus at hospitals and dispensaries, to abbreviate the period of infectivity of the patients.

German Measles.

1. *Infectious agent:* Unknown.
2. *Source of infection:* Secretions of the mouth and possibly of the nose.
3. *Mode of transmission:* By direct contact with the patient or with articles freshly soiled with the discharges from the nose or throat of the patient.
4. *Incubation period:* From 10 to 21 days.
5. *Period of communicability:* Eight days from onset of the disease.

6. *Method of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms.
      2. Isolation—Separation of the patient from nonimmune children, and exclusion of the patient from school and public places for the period of presumed infectivity.
      3. Immunization—None.
      4. Quarantine—None except exclusion of nonimmune children from school and public gatherings, from the eleventh to the twenty-second day from date of exposure to a recognized case.
      5. Concurrent disinfection—Discharges from the nose and throat of the patient and articles soiled by discharges.
      6. Terminal disinfection—Airing and cleaning.
   (B) General measures—
      None.

NOTE.—The reason for attempting to control this disease is that it may be confused with scarlet fever during its early stages; each person having symptoms of the disease should therefore be placed under the care of a physician and the case should be reported to the local department of health.

Glanders.

1. *Infectious agent: Bacillus mallei.*
2. *Source of infection:* Discharges from open lesions of mucous membranes, or of the skin of human or equine cases of the disease (i. e., pus and mucus from the nose, throat, and bowel discharges from infected man and horse).
3. *Mode of transmission:* Contact with a case or with articles freshly soiled by discharges from a human or equine case.
4. *Incubation period:* Unknown.
5. *Period of communicability:* Until bacilli disappear from discharges or until lesions have healed.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—By specific biological reactions, such as the complement fixation test, the mallein test, the agglutination test, or by nonspecific reactions, such as the Straus reaction, if confirmed by culture, or by identification of the *Bacillus mallei*, or by autopsy of doubtful cases.
      2. Isolation—Human case, at home or hospital; for infected horses, destruction rather than isolation is advised.
      3. Immunization—None of established value or generally accepted.
      4. Quarantine of all horses in an infected stable until all have been tested by specific reaction, and the removal of infected horses and terminal disinfection of stable have been accomplished.
      5. Concurrent disinfection—Discharges from human cases and articles soiled therewith.
      6. Terminal disinfection—Stables and contents where infected horses are found.
   (B) General measures—
      1. The abolition of the common drinking trough for horses.

6. *Methods of control*—Continued.
   (B) General measures—Continued.
   2. Sanitary supervision of stables and blacksmith shops.
   3. Semi-annual testing of all horses by a specific reaction where the disease is common.
   4. Testing of all horses offered for sale where the disease is common.

NOTE.—In this disease, as in all infectious or communicable diseases from which both animals and humans suffer, cases occurring in animals should be reported to the Department of Agriculture, and human cases should be reported to the Department of Health, reciprocal notification thereafter to be accomplished through official interdepartment channels.

Gonorrhoea.

1. *Infectious agent:* Gonococcus.
2. *Source of infection*: Discharges from lesions or inflamed mucous membranes and glands of infected persons, viz, urethral, vaginal, cervical, conjunctival mucous membranes, and Bartholin's or Skene's glands in the female, and Cowper's and the prostate glands in the male.
3. *Mode of transmission:* By direct personal contact with infected persons, and indirectly by contact with articles freshly soiled with the discharges of such persons.
4. *Incubation period:* One to eight days; usually three to five days.
5. *Period of communicability:* As long as the gonococcus persists in any of the discharges, whether the infection be an old or a recent one.
6. *Methods of control:*
   (A) The infected individual and his environment—
   1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination or serum reaction.
   2. Isolation—When the lesions are in the genito-urinary tract, exclusion from sexual contact, and when the lesions are conjunctival, exclusion from school or contact with children, as long as the discharges contain the infecting organism.
   3. Immunization—None.
   4. Quarantine—None.
   5. Concurrent disinfection—Discharges from lesions and articles soiled therewith.
   6. Terminal disinfection—None.
   (B) General measures—
   1. Education in matters of sex hygiene, particularly as to the fact that continence in both sexes at all ages is compatible with health and development.
   2. Provision for accurate and early diagnosis, and treatment in hospitals and dispensaries of infected persons with consideration for privacy of record and provision for following cases until cured.
   3. Repression of prostitution by use of police power and control of use of living premises.
   4. Restriction of sale of alcoholic beverages.
   5. Restrictions of advertising of services or medicines for the treatment of sex diseases, etc.
   6. Elimination of common towels and toilet articles from public places.

6. *Methods of control*—Continued.
   (B) General measures—Continued.
      7. Use of prophylactic silver solution in the eyes of the new born.
      8. Exclusion of persons in the communicable stage of the disease from participation in the preparing and serving of food.
      9. Personal prophylaxis should be advised to those who expose themselves to opportunity for infection.

Leprosy.

1. *Infectious agent: Bacillus lepræ.*
2. *Source of infection:* Discharges from lesions.
3. *Mode of transmission:* By close, intimate, and prolonged contact with infected individuals. Flies and other insects may be mechanical carriers.
4. *Incubation period:* Prolonged, undetermined.
5. *Period of communicability:* Infectivity exists throughout the duration of the disease. Where good standards of personal hygiene prevail this disease is but slightly communicable.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination.
      2. Isolation for life in national leprosarium when this is possible.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Discharges and articles soiled with discharges.
      6. Terminal disinfection—Thorough cleansing of living premises of the patient.
   (B) General measures—
      1. Lack of information as to the determining factors in the spread and communication of the disease makes any but general advice in matters of personal hygiene of no value.
      2. As a temporary expedient, lepers may be properly cared for in local hospitals, or if conditions of the patient and his environment warrant, he may be allowed to remain on his own premises under suitable regulations.

Malaria.

1. *Infectious agent:* The several species of malarial organisms.
2. *Source of infection:* The blood of an infected individual.
3. *Mode of transmission:* By bite of the infected Anopheles mosquitoes. The mosquito is infected by biting an individual suffering from acute or chronic malaria. The parasite develops in the body of the mosquito for from 10 to 14 days, after which time the sporozoites appear in its salivary glands.
4. *Incubation period:* Varies with the type of species of infecting organism and the amount of infection; usually 14 days in the tertian variety.
5. *Period of communicability:* As long as the malaria organism exists in the blood.

6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, always to be confirmed by microscopical examination of the blood. Repeated examinations may be necessary.
      2. Isolation—Exclusion of patient from approach of mosquitoes, until his blood is rendered free from malarial parasites by thorough treatment with quinine.
      3. Immunization—None. The administration of prophylactic doses of quinine should be insisted upon for those constantly exposed to infection and unable to protect themselves against Anopheles mosquitoes.
      4. Quarantine—None.
      5. Concurrent disinfection—None. Destruction of Anopheles mosquitoes in the sick room.
      6. Terminal disinfection—None. Destruction of Anopheles mosquitoes in the sick room.
   (B) General measures—
      1. Employment of known measures for destroying larvæ of anophelines and the eradication of breeding places of such mosquitoes.
      2. Blood examination of persons living in infected centers to determine the incidence of infection.
      3. Screening sleeping and living quarters; use of mosquito nets.
      4. Killing mosquitoes in living quarters.

Measles.

1. *Infectious agent:* A filterable virus.
2. *Source of infection:* Buccal and nasal secretions of an infected individual.
3. *Mode of transmission:* Directly from person to person; indirectly through articles freshly soiled with the buccal and nasal discharges of an infected individual. The most easily transmitted of all communicable diseases.
4. *Incubation period:* Seven to eighteen days; usually 14 days.
5. *Period of communicability:* During the period of catarrhal symptoms and until the cessation of abnormal mucous membrane secretions—minimum period of seven days; from two days before to five days after the appearance of the rash.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Special attention to rise of temperature, Koplik spots and catarrhal symptoms in exposed individuals.
      2. Isolation—During period of communicability.
      3. Immunization—None.
      4. Quarantine—Exclusion of exposed susceptible school children and teachers from school until 14 days from last exposure. This applies to exposure in the household. Exclusion of exposed susceptible children from all public gatherings for the same period.
      5. Concurrent disinfection—All articles soiled with the secretions of the nose and throat.
      6. Terminal disinfection—Thorough cleaning.

6. *Methods of control*—Continued.
   (B) General measures—
      1. Daily examination of exposed children and of other possibly exposed persons. This examination should include record of the body temperature. A nonimmune exposed individual exhibiting a rise of temperature of 0.5° C. or more should be promptly isolated pending diagnosis.
      2. Schools should not be closed or classes discontinued where daily observation of the children by a physician or nurse is provided for.
      3. Education as to special danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.

Mumps.

1. *Infective organism.*—Unknown.
2. *Source of infection.*—Secretions of the mouth and possibly of the nose.
3. *Mode of transmission.*—By direct contact with an infected person or with articles freshly soiled with the discharges from the nose or throat of such infected person.
4. *Incubation period.*—From 4 to 25 days. The most common period, 18 days, accepted as usual. A period of 21 days is not uncommon.
5. *Period of communicability.*—Unknown, but assumed to persist until the parotid gland has returned to its normal size.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Inflammation of Steno's duct may be of assistance in recognizing the early stage of the disease. The diagnosis is usually made on swelling of the parotid gland.
      2. Isolation—Separation of the patient from nonimmune children and exclusion of the patient from school and public places for the period of presumed infectivity. (See 5.)
      3. Immunization—None.
      4. Quarantine—Limited to exclusion of nonimmune children from school and public gatherings for 21 days after last exposure to a recognized case.
      5. Concurrent disinfection—All articles soiled with the discharges from the nose and throat of the patient.
      6. Terminal disinfection—None.
   (B) General measures—
      None.

Paratyphoid Fever.

1. *Infectious agent: Bacillus paratyphosus* A or B.
2. *Source of infection:* Bowel discharges and urine of infected persons, and foods contaminated with such discharges of infected persons or of healthy carriers. Healthy carriers may be numerous in an outbreak.
3. *Mode of transmission:* Directly by personal contact; indirectly by contact with articles freshly soiled with the discharges of infected persons or through milk, water, or food contaminated by such discharges.
4. *Incubation period.*—Four to ten days; average, seven days.

5. *Period of communicability.*—From the appearance of prodromal symptoms, throughout the illness and relapses, during convalescence, and until repeated bacteriological examinations of discharges show absence of the infecting organism.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by specific agglutination test, and by bacteriological examination of blood, bowel discharges, or urine.
      2. Isolation—In fly-proof room, preferably under hospital conditions, of such cases as can not command adequate sanitary environment and nursing care in their homes.
      3. Immunization of exposed susceptibles.
      4. Quarantine—None.
      5. Concurrent disinfection—Disinfection of all bowel and urinary discharges and articles soiled with them.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Purification of public water supplies.
      2. Pasteurization of public milk supplies.
      3. Supervision of other food supplies and of food handlers.[4]
      4. Prevention of fly breeding.
      5. Sanitary disposal of human excreta.
      6. Extension of immunization by vaccination as far as practicable.
      7. Supervision of paratyphoid carriers and their exclusion from the handling of foods.
      8. Systematic examination of fecal specimens, from those who have been in contact with recognized cases, to detect carriers.
      9. Exclusion of suspected milk supplies pending discovery of the person or other cause of contamination of the milk.
      10. Exclusion of water supply, if contaminated, until adequately treated with hypochlorite or other efficient disinfectant, or unless all water used for toilet, cooking, and drinking purposes is boiled before use.

Plague.

(Bubonic, septicemic, pneumonic.)

1. *Infectious agent.*—*Bacillus pestis.*
2. *Source of infection.*—Blood of infected persons and animals, and sputum of human cases of plague pneumonia.
3. *Mode of transmission.*—Direct, in the pneumonic form. In other forms the disease is generally transmitted by the bites of fleas (*Loemopsylla cheopis* and *Ceratophyllus fasciatus*), by which the disease is carried from rats to man, also by fleas from other rodents. Accidental, by inoculation, or by the bites of infected animals. Bedbugs may transmit the infection; flies may possibly convey the infection.

---

[4] The human disease paratyphoid fever should not be confused with cases of food poisoning, or infection due to enteritidis bacilli of animal origin.

4. *Incubation period.*—Commonly from 3 to 7 days, although occasionally prolonged to 8 or even 14 days.
5. *Period of communicability.*—Until convalescence is well established, period undetermined.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination of blood, pus from glandular lesion, or sputum.
      2. Isolation—Patient in hospital if practicable; if not, in a screened room which is free from vermin.[5]
      3. Immunization—Passive immunization of known exposed contacts; active immunization of those who may be exposed.
      4. Quarantine—Contacts for seven days.
      5. Concurrent disinfection—All discharges and articles freshly soiled therewith.
      6. Terminal disinfection—Thorough cleaning followed by thorough disinfection.
   (B) General measures—
      1. Extermination of rats and vermin by use of known methods for their destruction; destruction of rats on ships arriving from infected ports; examination of rats, ground squirrels, etc., in areas where the infection persists, for evidence of endemic or epidemic prevalence of the disease among them.
      2. Supervision of autopsies of all deaths during epidemics.
      3. Supervision of the disposal of the dead during epidemics, whether by burial, transfer, or holding in vault, whatever the cause of death.
      4. Cremation, or burial in quick lime, of those dying of this disease.

Poliomyelitis.

1. *Infectious agent:* Not definitely determined. Believed to be a filterable virus.
2. *Source of infection:* Nose, throat, and bowel discharges of infected persons or articles recently soiled therewith. Healthy carriers are supposed to be common.
3. *Mode of transmission;* By direct contact with an infected person or with a carrier of the virus, or indirectly by contact with articles freshly soiled with the nose, throat, or bowel discharges of such persons.
4. *Incubation period:* From 3 to 10 days, commonly 6 days.
5. *Period of communicability:* Unknown; apparently not more than 21 days from the onset of disease, but many precede onset of clinical symptoms by several days.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, assisted by chemical and microscopical examination of the spinal fluid.
      2. Isolation of all recognized cases in screened rooms.
      3. Immunization—None.

---

[5] In plague pneumonia, personal prophylaxis, to avoid droplet infection, must be carried out by persons who come in contact with the sick. Masks or veils of cheese cloth should be worn as protective measures.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Con.
      4. Quarantine of exposed children of the household and of adults of the household whose vocation brings them into contact with children, or who are food handlers, for 14 days from last exposure to a recognized case.
      5. Concurrent disinfection—Nose, throat, and bowel discharges and articles soiled therewith.
      6. Terminal disinfection—Cleaning.
   (B) General measures during epidemics—
      1. Search for and examination of all sick children should be made.
      2. All children with fever should be isolated pending diagnosis.
      3. Education in such technique of bedside nursing as will prevent the distribution of infectious discharges to others from cases isolated at home.

Rabies.

1. *Infectious agent.*—Unknown.
2. *Source of infection.*—Saliva of infected animals, chiefly dogs.
3. *Mode of transmission.*—Inoculation with saliva of infected animals through abrasion of skin or mucus membrane, almost always by bites or scratches.
4. *Incubation period.*—Usually 2 to 6 weeks. May be prolonged to 6 months or even longer.
5. *Period of communicability.*—For 15 days in the dog (not known in man) before the onset of clinical symptoms and throughout the clinical course of the disease.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by the presence of Negri bodies in the brain of an infected animal, or by animal inoculations with material from the brain of such infected animal.
      2. Isolation—None if patient is under adequate medical supervision, and the immediate attendants are warned of possibility of inoculation by human virus.
      3. Immunization—Preventive vaccination (Pasteur treatment) after exposure to infection by inoculation.
      4. Quarantine—None.
      5. Concurrent disinfection of saliva of patient and articles soiled therewith.
      6. Terminal disinfection—Thorough cleaning.
   (B) General measures—
      1. Muzzling of dogs when on public streets, or in places to which the public has access.
      2. Detention and examination of dogs suspected of having rabies.
      3. Immediate antirabic treatment of people bitten by dogs or by other animals suspected or known to have rabies, unless the animal is proved not to be rabid by subsequent observation or by microscopic examination of the brain and cord.

Pneumonia.

(Acute lobar.)

1. *Infectious agent.*—Various pathogenic bacteria commonly found in the nose, throat, and mouth, such as the pneumococcus, the bacillus of Freidlander, the influenza bacillus, etc.
2. *Source of infection.*—Discharges from the mouth and nose of apparently healthy carriers, as well as of recognized infected individuals, and articles freshly soiled with such discharges.
3. *Mode of transmission.*—By direct contact with an infected person, or with articles freshly soiled with the discharges from the nose or throat of, and possibly from infected dust or rooms occupied by, infected persons.
4. *Incubation period.*—Short, usually two to three days.
5. *Period of communicability.*—Unknown; presumably until the mouth and nasal discharges no longer carry the infectious agent in an abundant amount or in a virulent form.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Specific infecting organisms may be determined by serological and bacteriological tests early in the course of the disease.
      2. Isolation—Patient during clinical course of the disease.
      3. Immunization—None: vaccines are worthy of further careful trial.
      4. Quarantine—None.
      5. Concurrent disinfection—Discharges from the nose and throat of the patient.
      6. Terminal disinfection—Thorough cleaning, airing, and sunning.
   (B) General measures—
      In institutions and camps, when practicable, people in large numbers should not be congregated closely within doors. The general resistance should be conserved by good feeding, fresh air, temperance in the use of alcoholic beverages, and other hygienic measures.

NOTE.—The early reporting of pneumonia is highly desirable in view of its communicability and the possibility of effective treatment of certain types with curative sera.

Rocky Mountain Spotted or Tick Fever.

1. *Infectious agent.*—Unknown.
2. *Source of infection.*—Blood of infected animals, and infected ticks (Dermacentor species).
3. *Mode of transmission.*—By bites of infected ticks.
4. *Incubation period.*—Three to ten days, usually seven days.
5. *Period of communicability.*—Has not been definitely determined, probably during the febrile stage of the disease.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms of the disease in areas where the disease is known to be endemic.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Con.
      2. Isolation—None, other than care exercised to protect patients from tick bites when in endemic areas.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—None. All ticks on the patient should be destroyed.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Personal prophylaxis of persons entering the infected zones during the season of ticks, by wearing tick-proof clothing, and careful daily search of the body for ticks which may have attached themselves.
      2. The destruction of ticks by clearing and burning vegetation on the land in infected zones.
      3. The destruction of ticks on domestic animals by dipping, and the pasturing of sheep on tick-infested areas where the disease is prevalent, with the object of diminishing the number of ticks.
      4. The destruction of small mammalian hosts, such as ground squirrels, chipmunks, etc.

Scarlet Fever.

1. *Infectious agent.*—Unknown.
2. *Source of infection.*—The belief at present is that the virus is contained in the secretions from the nose and throat, in the blood and in the lymph nodes, and that it is given off in the discharges from the mouth, the nose, the ears, and from broken-down glands of infected persons.
3. *Mode of transmission.*—Directly by personal contact with an infected person; indirectly by articles freshly soiled with discharges of an infected person, or through contaminated milk.
4. *Incubation period.*—Two to seven days, usually three or four days.
5. *Period of communicability.*—Four weeks from the onset of the disease, without regard to desquamation, and until all abnormal discharges have stopped and all open sores have healed.
6. *Methods of control.*—
   (A) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms.
      2. Isolation—In home or hospital, maintained in each case until the end of the period of infectivity.
      3. Immunization—None.
      4. Quarantine—Exclusion of exposed susceptible children and teachers from school, and food handlers from their work, until seven days have elapsed since last exposure to a recognized case.
      5. Concurrent disinfection—Of all articles which have been in contact with a patient and all articles soiled with discharges of the patient.
      6. Terminal disinfection—Thorough cleaning.

6. *Methods of control*—Continued.
   (B) General measures—
      1. Daily examination of exposed children and of other possibly exposed persons for a week after last exposure.
      2. Schools should not be closed where daily observation of the children by a physician or nurse can be provided for.
      3. Education as to special danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.
      4. Pasteurization of milk supply.

Septic Sore Throat.

1. *Infectious agent.*—Streptococcus (hemolytic type).
2. *Source of infection.*—The human nasopharynx, usually the tonsils, any case of acute streptococcus inflammation of these structures being a potential source of infection, including the period of convalescence of such cases. The udder of a cow infected by the milker is an occasional source of infection. In such udders the physical signs of mastitis are usually absent.[6]
3. *Mode of transmission.*—Direct or indirect human contact; consumption of raw milk from an infected udder.
4. *Incubation period.*—One to three days.
5. *Period of communicability.*—In man, presumably during the continuance of clinical symptoms; in the cow, during the continuance of discharge of the streptococci in the milk, the condition in the udder tending to a spontaneous subsidence. The carrier stage may follow convalescence and persist for some time.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Bacteriological examination of the lesions or discharges from the tonsils and nasopharynx may be useful.
      2. Isolation—During the clinical course of the disease and convalescence, and particularly exclusion of the patient from participation in the production or handling of milk or milk products.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Articles soiled with discharges from the nose and throat of the patient.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Exclusion of suspected milk supply from public sale or use, until pasteurized. The exclusion of the milk of an infected cow or cows in small herds is possible when based on bacteriological examination of the milk of each cow, and preferably the milk from each quarter of the udder at frequent intervals.
      2. Pasteurization of all milk.
      3. Education in the principles of personal hygiene and avoidance of the use of common towels, drinking and eating utensils.

---

[6] Mastitis in the cow, due to bovine streptococci, is not a cause of septic sore throat in humans unless a secondary infection of the udder by a human type of streptococcus takes place.

Smallpox.

1. *Infectious agent.*—Unknown.
2. *Source of infection.*—Lesions of the skin and mucous membranes of infected persons.
3. *Mode of transmission.*—By direct personal contact; by articles soiled with discharges from lesions. The virus may be present in all body discharges, including feces and urine. It may be carried by flies.
4. *Incubation period.*—Twelve to fourteen days. (Cases with incubation period of 21 days are reported.)
5. *Period of communicability.*—From first symptoms to disappearance of all scabs and crusts.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Tests for immunity may prove useful.
      2. Isolation—Hospital isolation in screened wards, free from vermin, until the period of infectivity is over.
      3. Immunization—Vaccination.
      4. Quarantine—Segregation of all exposed persons for 21 days from date of last exposure, or until protected by vaccination.
      5. Concurrent disinfection of all discharges and articles soiled therewith.
      6. Terminal disinfection—Thorough cleaning and disinfection of premises.
   (B) General measures—
      General vaccination in infancy, revaccination of children on entering school, and of entire population when the disease is prevalent.

NOTE.—Adjustment of the time of vaccination of infants to avoid teething or other mild and common indispositions, the time of vaccination of children of the runabout age and older with preference for the cool months of the year, and the manner of vaccination with preference for the single puncture or small area scratch method through the droplet of virus are important to observe in order to avoid possible complications or secondary and subsequent infections at the site of vaccination. Vaccination before the age of six months is particularly desirable.

Syphilis.

1. *Infectious agent.—Treponema pallidum.*
2. *Source of infection.*—Discharges from the lesions of the skin and mucous membranes, and the blood of infected persons, and articles freshly soiled with such discharges or blood in which the *Treponema pallidum* is present.
3. *Mode of transmission.*—By direct personal contact with infected persons, and indirectly by contact with discharges from lesions or with the blood of such persons.
4. *Incubation period.*—About three weeks. (In rare instances reported to have been as long as 70 days.)
5. *Period of communicability.*—As long as the lesions are open upon the skin or mucous membranes and until the body is freed from the infecting organisms, as shown by microscopic examination of material from ulcers and by serum reactions.

6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by microscopical examination of discharges and by serum reactions.
      2. Isolation—Exclusion from sexual contact and from preparation or serving of food during the early and active period of the disease; otherwise none, unless the patient is unwilling to heed, or is incapable of observing, the precautions required by the medical adviser.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of discharges and of articles soiled therewith.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Education in matters of sexual hygiene, particularly as to the fact that continence in both sexes and at all ages is compatible with health and development.
      2. Provision for accurate and early diagnosis and treatment, in hospitals and dispensaries, of infected persons, with consideration for privacy of record, and provision for following cases until cured.
      3. Repression of prostitution by use of the police power and control of use of living premises.
      4. Restriction of sale of alcoholic beverages.
      5. Restriction of advertising of services or medicines for treatment of sex diseases, etc.
      6. Abandonment of the use of common towels, cups, and toilet articles and eating utensils.
      7. Exclusion of persons in the communicable stage of the disease from participation in the preparing and serving of food.
      8. Personal prophylaxis should be advised to those who expose themselves to opportunity to infection.

Tetanus.

1. *Infectious agent.*—*Bacillus tetani.*
2. *Source of infection.*—Animal manure, and soil fertilized with animal manure, and, rarely, the discharges from wounds.
3. *Mode of transmission.*—Inoculation, or wound infection.
4. *Incubation period.*—Six to fourteen days, usually nine.
5. *Period of communicability.*—Patient not infectious except in rare instances where wound discharges are infectious.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms; may be confirmed bacteriologically.
      2. Isolation—None.
      3. Immunization—By antitoxin, single or repeated injection.
      4. Quarantine—None.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—None.

6. *Methods of control*—Continued.
   (B) General measures—
      1. Supervision of the practice of obstetrics.
      2. Educational propaganda such as "safety-first" campaign, and "safe and sane Fourth of July" campaign.
      3. Prophylactic use of tetanus antitoxin where wounds have been acquired in regions where the soil is known to be heavily contaminated, and in all cases where wounds are ragged or penetrating.
      4. Removal of all foreign matter as early as possible from all wounds.
      5. Supervision of biological products, especially vaccines and sera.

Trachoma.

1. *Infectious agent:*[7]—The chief, although not yet known to be the only, infectious agents are the hemoglobinophilic bacilli including the so-called Koch-Weeks bacillus.
2. *Source of infection.*—Secretions and purulent discharges from the conjunctivae and adnexed mucous membranes of the infected persons.
3. *Mode of transmission.*—By direct contact with infected persons and indirectly by contact with articles freshly soiled with the infective discharges of such persons.
4. *Incubation period.*—Undetermined.
5. *Period of communicability.*—During the persistence of lesions of the conjunctivae and of the adnexed mucous membranes or of discharges from such lesions.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Bacteriological examination of the conjunctival secretions and lesions may be useful.
      2. Isolation—Exclusion of the patient from general school classes.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of discharges and articles soiled therewith.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Search for cases by examination of school children, of immigrants, and among the families and associates of recognized cases; in addition, search for acute secreting disease of conjunctivae and adnexed mucous membranes, both among school children and in their families, and treatment of such cases until cured.
      2. Elimination of common towels and toilet articles from public places.
      3. Education in the principles of personal cleanliness and the necessity of avoiding direct or indirect transference of body discharges.
      4. Control of public dispensaries where communicable eye diseases are treated.

---

[7] It has not yet been proved that trachoma is due to one specific organism.

Trichinosis.

1. *Infectious agent.—Trichinella spiralis.*
2. *Source of infection.*—Uncooked or insufficiently cooked meat of infected hogs.
3. *Mode of transmission.*—Consumption of undercooked infected pork products.
4. *Incubation period.*—Variable: usually about one week.
5. *Period of communicability.*—Disease is not transmitted by human host.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by microscopical examination of muscle tissue containing trichinæ.
      2. Isolation—None.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Sanitary disposal of the feces of the patient.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Inspection of pork products for the detection of trichinosis.
      2. Thorough cooking of all pork products at a temperature of 160° F. or over.

Tuberculosis (Pulmonary).

1. *Infectious agent.—Bacillus tuberculosis* (human). (In rare instances the bovine tubercle bacillus has been proved to be the cause of a pulmonary tuberculosis.)
2. *Source of infection.*—The specific organism present in the discharges, or articles freshly soiled with the discharges from any open tuberculous lesions, the most important discharge being sputum. Of less importance are discharges from the intestinal and genito-urinary tracts, or from lesions of the lymphatic glands, bone, and skin.
3. *Mode of transmission.*—Direct or indirect contact with an infected person by coughing, sneezing, or other droplet infection, kissing, common use of unsterilized food utensils, pipes, toys, drinking cups, etc., and possibly by contaminated flies and dust.
4. *Incubation period.*—Variable and dependent upon the type of the disease.
5. *Period of communicability.*—Exists as long as the specific organism is eliminated by the host. Commences when a lesion becomes an open one, i. e. discharging tubercle bacilli, and continues until it heals or death occurs.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms and by thorough physical examination, confirmed by bacteriological examination and by serological tests.
      2. Isolation of such "open" cases as do not observe the precautions necessary to prevent the spread of the disease.
      3. Immunization—None.
      4. Quarantine—None.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Con.
      5. Concurrent disinfection of sputum and articles soiled with it. Particular attention should be paid to prompt disposal or disinfection of sputum itself, of handkerchiefs, cloths, or paper soiled therewith, and of eating utensils used by the patient.
      6. Terminal disinfection—Cleaning and renovation.
   (B) General measures—
      1. Education of the public in regard to the dangers of tuberculosis and the methods of control, with especial stress upon the danger of exposure and infection in early childhood.
      2. Provision of dispensaries and visiting-nurse service for discovery of early cases and supervision of home cases.
      3. Provision of hospitals for isolation of advanced cases, and sanatoria for the treatment of early cases.
      4. Provision of open-air schools and preventoria for pretuberculous children.
      5. Improvement of housing conditions and the nutrition of the poor.
      6. Ventilation, and elimination of dusts in industrial establishments and places of public assembly.
      7. Improvement of habits of personal hygiene and betterment of general living conditions.
      8. Separation of babies from tuberculous mothers at birth.

Tuberculosis (Other than Pulmonary).

1. *Infectious agent.—Bacillus tuberculosis* (human and bovine).
2. *Source of infection.*—Discharges from mouth, nose, bowels, and genito-urinary tract of infected humans; articles freshly soiled with such discharges; milk from tuberculous cattle; rarely the discharging lesion of bones, joints, and lymph nodes.
3. *Mode of transmission.*—By direct contact with infected persons, by contaminated food, and possibly by contact with articles freshly soiled with the discharges of infected persons.
4. *Incubation period.*—Unknown.
5. *Period of communicability.*—Until lesions are healed.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms confirmed by bacteriological and serological examinations.
      2. Isolation—None.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Discharges and articles freshly soiled with them.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Pasteurization of milk and inspection of meats.
      2. Eradication of tuberculous cows from milch herds used in supplying raw milk.
      3. Patients with open lesions should be prohibited from handling foods which are consumed raw.

Typhoid Fever.

1. *Infectious agent.*—*Bacillus typhosus.*
2. *Source of infection.*—Bowel discharges and urine of infected individuals. Healthy carriers are common.
3. *Mode of transmission.*—Conveyance of the specific organism by direct or indirect contact with a source of infection. Among indirect means of transmission are contaminated water, milk, and shellfish. Contaminated flies have been common means of transmission in epidemics.
4. *Incubation period.*—From 7 to 23 days, averaging 10 to 14 days.
5. *Period of communicability.*—From the appearance of prodromal symptoms, throughout the illness and relapses during convalescence, and until repeated bacteriological examinations of the discharges show persistent absence of the infecting organism.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by specific agglutination test and bacteriological examination of blood, bowel discharges, or urine.
      2. Isolation—In fly-proof room, preferably under hospital conditions, of such cases as can not command adequate sanitary environment and nursing care in their homes.
      3. Immunization—Of susceptibles who are known to have been exposed or are suspected of having been exposed.
      4. Quarantine—None.
      5. Concurrent disinfection—Disinfection of all bowel and uninary discharges and articles soiled with them.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Purification of public water supplies.
      2. Pasteurization of public milk supplies.
      3. Supervision of other food supplies and of food handlers.
      4. Prevention of fly breeding.
      5. Sanitary disposal of human excreta.
      6. Extension of immunization by vaccination as far as practicable.
      7. Supervision of typhoid carriers and their exclusion from the handling of foods.
      8. Systematic examination of fecal specimens from those who have been in contact with recognized cases to detect carriers.
      9. Exclusion of suspected milk supplies pending discovery of the person or other cause of contamination of the milk.
      10. Exclusion of water supply, if contaminated, until adequately treated with hypochlorite or other efficient disinfectant, or unless all water used for toilet, cooking, and drinking purposes is boiled before use.

Typhus Fever.

1. *Infectious agent.*—*Bacillus typhi-exanthematici* is claimed to be the causative agent; not yet definitely determined.
2. *Source of infection.*—The blood of infected individuals.
3. *Mode of transmission.*—Infectious agent transmitted by lice. (*Pediculus corporis, P. capitis.*)
4. *Incubation period.*—Five to twenty days, usually twelve days.
5. *Period of communicability.*—Until 36 hours have elapsed after the temperature reaches normal.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. (Confirmation by bacteriological examination of blood is claimed by Plotz.)
      2. Isolation—In a vermin-free room. All attendants should wear vermin-proof clothing.
      3. Immunization—Claimed to be practicable by use of vaccine (Plotz, Olitzky, and Baehr). Not yet generally accepted.
      4. Quarantine—Exposed susceptibles for 12 days after last exposure.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—Destroy all vermin and vermin eggs on body of patient, if not already accomplished. Destroy all vermin and eggs on clothing. Rooms to be rendered free from vermin.
   (B) General measures—
      Delousing of persons, clothing, and premises during epidemics, or when they have come or have been brought into an uninfected place from an infected community.

Whooping Cough.

1. *Infectious agent.*—*Bacillus pertussis* (Bordet, Gengou).
2. *Source of infection.*—Discharges from the laryngeal and bronchial mucous membranes of infected persons (sometimes also of infected dogs and cats, which are known to be susceptible).
3. *Mode of transmission.*—Contact with an infected person or animal or with articles freshly soiled with the discharges of such person or animal.
4. *Incubation period.*—Within 14 days.
5. *Period of communicability.*—Particularly communicated in the early catarrhal stages before the characteristic whoop makes the clinical diagnosis possible. Communicability probably persists not longer than two weeks after the development of the characteristic whoop or approximately four weeks after the onset of catarrhal symptoms.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, supported by a differential leucocyte count, and confirmed where possible by bacteriological examination of bronchial secretions.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Con.
      2. Isolation—Separation of the patient from susceptible children, and exclusion of the patient from school and public places, for the period of presumed infectivity.
      3. Immunization—Use of prophylactic vaccination recommended by some observers. Not effective in all cases.
      4. Quarantine—Limited to the exclusion of non-immune children from school and public gatherings for 14 days after their last exposure to a recognized case.
      5. Concurrent disinfection—Discharges from the nose and throat of the patient and articles soiled with such discharges.
      6. Terminal disinfection—Cleaning of the premises used by the patient.
   (B) General measures—
      Education in habits of personal cleanliness and in the dangers of association or contact with those showing catarrhal symptoms with cough.

Yellow Fever.

1. *Infectious agent.*—Unknown.
2. *Source of infection.*—The blood of infected persons.
3. *Mode of transmission.*—By the bite of infected *Aedes calopus* mosquitoes.
4. *Incubation period.*—Three to five days, occasionally six days.
5. *Period of communicability.*—First three days of the fever.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms.
      2. Isolation—Isolate from mosquitoes in a special hospital ward or thoroughly screened room. If necessary the room or ward should be freed from mosquitoes by fumigation. Isolation necessary only for the first three days of the fever.
      3. Immunization—None.
      4. Quarantine—Contacts for six days.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—None. Upon termination of case the premises should be rendered free from mosquitoes by fumigation.
   (B) General measures—
      Eliminate mosquitoes by rendering breeding impossible.
   (C) Epidemic measures—
      1. Inspection service for the detection of those ill with the disease.
      2. Fumigation of houses in which cases of disease have occurred, and of all adjacent houses.
      3. Destruction of *Aedes calopus* mosquitoes by fumigation; use of larvicides; eradication of breeding places.

4.09
3m
26

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 26

QUESTIONS AND ANSWERS ON TUBERCULOSIS

By

BENJAMIN K. HAYS

Acting Assistant Surgeon
United States Public Health Service

PREPARED BY DIRECTION OF THE SURGEON GENERAL

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 26

QUESTIONS AND ANSWERS ON TUBERCULOSIS

By

BENJAMIN K. HAYS

Acting Assistant Surgeon
United States Public Health Service

PREPARED BY DIRECTION OF THE SURGEON GENERAL

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

614.09
T1n3m
no.26

QUESTIONS AND ANSWERS ON TUBERCULOSIS.

1. What are the first symptoms of tuberculosis?

Tuberculosis may show itself in many different ways. There may be a cough, fever, rapid pulse or chills; or there may be loss of strength, loss of weight, or loss of appetite; the patient may be subject to frequent attacks of indigestion or "biliousness"; there may be night sweats or spitting of blood; or the patient may notice that he is easily fatigued or is not refreshed by a night's sleep. The presence of any one of these symptoms for a prolonged period should call for a careful investigation of its cause.

Again, the disease may be present and give rise to no noticeable symptoms, the man feeling perfectly well.

2. Is tuberculosis a common disease?

It is. There are over 1,000,000 active cases in the United States at the present time. It causes more deaths, more widows, more orphans, more invalids, and greater monetary loss than any other one disease. It kills 150,000 people in this country every year. It kills one-eighth of all the people who die, and nearly one-fourth of all the people who die between the ages of 15 and 45.

3. At what age is tuberculosis most common?

In young adults. It is for this reason that the disease causes so much financial loss. It comes on just as a person has reached the productive age and after the cost of rearing and education has been paid. It is the boy or girl just out of college, the young business man, or the young mother who is stricken and for years becomes a charge upon friends and family.

4. Can tuberculosis be cured?

As a rule, yes. When discovered in its early stages and properly treated it almost always gets well.

5. What is the difference between tuberculosis and consumption?

Tuberculosis may attack any part of the body. Consumption is an advanced form of tuberculosis of the lungs.

6. Why does a disease that can be cured kill so many people?

Because:

(*a*) Many who have the disease do not know it until too late.

(*b*) Many people who have been told that they have the disease do not believe it.

(*c*) Many people who know that they have the disease refuse to carry out the proper treatment.

(*d*) Many people who have the disease have dependent families and feel that it is impossible for them to stop work.

(*e*) Many people who have the disease are unable to pay for treatment.

(*f*) Many people who take treatment believe that they are well and return to work while the disease is still active.

7. What are the most important steps to take to reduce the number of deaths from tuberculosis?

(*a*) Improve the sanitary conditions of homes, shops, and factories.

(*b*) Instruct the public in the nature of the disease, its cause, prevention, and cure.

(*c*) Prevent childhood exposure to the disease.

(*d*) Impress upon patients the importance of persisting in the "cure."

8. Should a patient with tuberculosis be told that he has the disease?

He should. Not to do so is criminal. The only hope of cure depends upon the intelligent cooperation of the patient. He should be told exactly what his condition is and what he must do to get well.

9. Is tuberculosis hereditary?

No. Consumption runs in certain families because of the exposure of the young child to the disease. A baby born of a consumptive mother, if removed from its mother immediately after birth, is in no more danger of developing the disease than a child born of a healthy mother.

10. What is the cause of tuberculosis?

It is due to a germ called the Bacillus Tuberculosis. The germ is of vegetable origin and grows in the body much in the same way as mold grows upon food. It is so small that a thousand of them piled together could not be seen by the naked eye.

11. What is a tubercle?

The word means a small mass. From the likeness of a tubercle to a millet seed one form of the disease is called "miliary tuberculosis." These little masses or capsules form wherever the germs are deposited on the body. At first they are too small to be seen by the naked eye, but they may grow to the size of a large marble.

12. Do the germs grow outside the body?

No. Certain forms of the germ grow in the body of the lower animals, especially in cattle, but the germs do not grow in filth as was formerly supposed.

13. How long do the germs live outside the body?

That depends upon circumstances. The germs are killed by sunshine, daylight, and drying. The dry and unprotected germs are killed by a few minutes exposure to the direct rays of the sun, and they are killed in a few days in a well-lighted

and well-ventilated room. If protected by warmth, moisture, and darkness, as in a dirty carpet or in the cracks of the floor of a dark, closed room, the germs my live for months or possibly for years.

14. Where are the germs usually found?

Chiefly in the sputum of persons suffering with the disease; sometimes in the milk of diseased cows. The germs are always present in any lesion (sore) of a tuberculous nature.

15. How do the germs get into the body?

Usually from the sputum of a tuberculosis patient or from milk. The germs may be deposited upon dust, especially the dust of a foul room, and drawn into the lungs by breathing. The germs are frequently present in the fine spray coughed out by tuberculosis patients, and this spray is often coughed directly into the faces of other people. The germs may be deposited upon the rim of a cup or glass or upon a fork or spoon, or upon any article, such as pencil or coin, that is placed in the mouth of a tuberculosis patient, and in this way may be conveyed to the mouths of others. Tuberculosis patients often have the germs upon their hands, from whence they are easily passed to the hands of others and thence to the mouth. Tuberculous cooks deposit germs upon the food that they handle, as do tuberculous butchers and bakers. Children crawling upon a dirty floor get the germs upon their hands, or they may get the germs from marbles, hoops, ball, etc., that have been in contact with sputum upon the street, deposited there by a tuberculous person. The germs are also obtained from the milk of tuberculous cows.

16. How long after the germs get into the body before one develops tuberculosis?

All persons who get the germs into their bodies do not develop the disease. It is probable that most of the germs that get into the body are destroyed before they do any harm. O

the other hand, the germs that find lodgment in the body live and, to a limited degree, multiply and yet never give rise to active tuberculosis. The enlarged glands so often seen in children are, more frequently than not, due to tuberculosis, yet the child may never develop an active form of the disease. Such persons are said to be infected or to have "latent tuberculosis." When the disease becomes active it is called "manifest tuberculosis." There is good reason to believe that most persons become infected in childhood. If, later in life, the disease becomes active, it is believed in most cases to be due to the childhood infection.

17. Is there any way to tell if a person has become infected with tuberculosis?

Yes. There is a simple test, not unlike vaccination, known as the Von Pirquet test, by means of which it can be told whether or not a person has become infected. From this test it is known that most grown people are infected with the germs of tuberculosis.

18. In what form does the disease show itself?

The symptoms depend upon the location, activity, and extent of the disease. Some of the forms of tuberculosis are the following:

"Scrofula," or tuberculosis of the glands; "lupus," or tuberculosis of the skin; "white swelling," or tuberculosis of the joints; "hunchback," frequently due to tuberculosis of the vertebræ.

Miliary tuberculosis is an acute form of the disease giving rise to symptoms that sometimes resemble those of typhoid fever, sometimes those of pneumonia, and sometimes those of brain fever (tuberculous meningitis).

Tuberculosis of the lungs, phthisis, or consumption, is the most common form of the disease. It may run a rapid course called "galloping consumption," or it may run a slow course, and when there is evidence of healing (formation of scar tissue) it is called "fibroid" tuberculosis.

Tuberculosis of the bowels, of the kidneys, and of other organs is quite common. Ninety per cent of all deaths from tuberculosis are due to the disease in the lungs.

19. Is tuberculosis preventable?

Yes. It is impossible to have the disease unless the germs get into the body. Since young children contract the disease most easily, they should be guarded against exposure. Older people should guard not only against exposure but against a breakdown in case they have become infected.

20. Is association with a person with tuberculosis dangerous?

For children; yes. For grown people, not if patient is careful in his habits. The careful consumptive is not a source of danger, and there is no reason why such a person should be avoided.

21. What precaution should persons with tuberculosis take to prevent giving the disease to others?

All sputum should be destroyed. Never spit except into a sputum cup or into an open fire. When coughing or sneezing shield the mouth with a paper napkin. Be exceedingly careful not to cough or sneeze into the faces of others. Keep the hands clean and free from the moisture of the mouth. Avoid the use of common drinking cups, and do not place in the mouth any article, such as a pencil, or coin, that will be handled by others. An easy way to transmit the germs is by kissing upon the lips. Under no circumstances should any person kiss an infant upon the mouth.

22. When a person becomes infected what causes the disease to become active?

Anything that reduces the general health and strength such as overwork, worry, loss of sleep, dissipation, poor food acute illnesses, and the habit of sitting, working, or sleeping in a poorly ventilated room.

23. What is the treatment of an uncomplicated case of tuberculosis of the lungs?

Rest, food, fresh air, and a contented mind.

24. How long does it take to effect a cure of the disease?

No person with active tuberculosis can hope to be entirely well in less than two or three years. In many cases it takes longer than this. Sometimes the disease lasts through a long and useful life, as was the case with Trudeau, the well-known American physician and pioneer in sanatorium treatment.

On the other hand, it must be remembered that many people have the disease in a mild form and never know it. In such cases there must have been a rapid cure.

25. What medicines are of use in tuberculosis?

No known medicine has any tendency to destroy the germs in the body. The entire treatment depends upon building up the general health of the body.

26. Does the general health improve faster when the person with tuberculosis is taking active exercises?

No. A cure of any inflamed organ depends upon keeping the part at rest. An abscess upon the hand does not get well while one is using that hand, nor does a broken leg get well while one is walking about. It is just as important to give rest to an inflamed lung as to a broken leg.

27. What are the indications for complete bed rest in tuberculosis?

Fever, rapid pulse, rapid breathing, loss of weight, weakness, or anything that indicates that the patient is not well, whether it is discovered by the patient himself or by the physician.

28. What rules should be observed in regard to diet?

The same rules that would be observed by a man in training for a prize fight or for a football game. Try to bring the body

to the highest point in nutrition. Avoid stuffing, especially between meals. Do not eat sweets or take soft drinks upon an empty stomach.

29. How does the mental attitude affect the patient?

In every way. It is absolutely necessary that the patient should WILL TO GET WELL. Unless he has entered into the SPIRIT OF THE CURE, and is willing to follow directions, time and money spent in treatment are thrown away. The matter of getting well must become his business in life, and he must give to this business the same time and thought that he would give to getting an education or learning a trade.

30. What advantages are there in hospital over home treatment?

(*a*) The patient is removed from business care.

(*b*) He is not constantly receiving bad advice from misguided friends.

(*c*) He is free from the domestic and social annoyances of home life.

(*d*) He is not under constant temptation to do things that he knows are hurtful.

(*e*) He is under the medical care of a tuberculosis specialist.

(*f*) He receives intelligent nursing.

(*g*) He devotes himself to the business of getting well.

(*h*) He learns the "rules of the game" and makes these rules become the habit of his life.

(*i*) He can get complete rest which is often impossible at home.

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 27

TUBERCULOSIS

ITS NATURE AND PREVENTION

By

F. C. SMITH
Surgeon, U. S. Public Health Service

UNIVERSITY OF ILLINOIS LIBRARY
AUG 2 1921

Prepared by direction of the Surgeon General

WASHINGTON
GOVERNMENT PRINTING OFFICE
1921

TUBERCULOSIS: ITS NATURE AND PREVE.

By Surgeon F. C. Smith.

"*It is in the power of man to cause all parasitic (germ) diseases to disappear from the world.*"—Pasteur.

At this date, February 1, 1921, approximately 10,000 discharged tuberculous soldiers are receiving treatment in Government Sanatoria. Many others are not under treatment. Some of these are woefully ignorant of the simple facts regarding the disease. Indeed, the facts as to the nature and prevention of tuberculosis are not generally appreciated, although it is both curable and controllable. Many sufferers of the disease through neglect, lose their chances of again becoming useful citizens and while they live, only prove a menace to society.

As we learn more about diseases it is found that many of them can be prevented. Some have almost ceased to exist, as ship fever, while others, like smallpox and scurvy, have been greatly lessened. Now a great popular fight is being made against tuberculosis. It is the most important disease we have to combat, for it causes about 143,000 deaths in the United States every year and is commonest between the ages of 20 and 50, at which time people are most free from other diseases. Moreover, that is the money-earning period of life and the years of invalidism caused by tuberculosis are an important cause of poverty. It is preventable, but it can not be suppressed by health authorities like the quarantinable diseases, because it is too common and too chronic. Each family must be taught how to meet the danger and every person must learn how to protect himself against infection. If everyone—men, women, and children—will learn the important facts about tuberculosis and the means for its prevention, the next few years will witness a marked decrease in the disease, and the coming generation may see its way clear to complete freedom from it.

TUBERCULOSIS OF THE LUNGS (CONSUMPTION, PHTHISIS, PULMONARY TUBERCULOSIS) CAUSES MORE DEATHS THAN ANY OTHER DISEASE EXCEPT HEART DISEASE.

While tuberculosis is most common in young adult life, it may occur at any age. When babies have it, the intestines or membranes of the brain are parts frequently attacked, and death follows from peritonitis or tuberculous meningitis. Tuberculosis of the bones is common in children, and disease of the knee or hip joint or spine is usually tuberculous. It may attack any part of the body, and there is a form in which it occurs in many organs simultaneously, the patient

614.09
Z1n3m
no.27

dying of general tuberculosis. But the form in which the disease most commonly occurs at all ages is tuberculosis of the lungs; about nine-tenths of all the deaths from tuberculosis are due to this variety.

IT IS TRANSMITTED FROM THE SICK TO THE WELL.

Tuberculosis is a contagious disease. Every existing case contracted it by breathing in or swallowing the germs which cause it. It is probably never inherited. Children of consumptive patients often become tuberculous because they have lived in an infected house and have inhaled and swallowed the germs repeatedly. It is not intensely contagious, like measles and scarlet fever; it is not contracted by merely coming in contact with a consumptive, nor even by living in the house with him, if he is careful and clean. It requires an intimate exposure to the disease, such as occurs when one sleeps with a consumptive, uses the same drinking cup, dishes, or towel, or shares a living room day after day with a careless patient, who spits on the floor or coughs with uncovered mouth. Its contagiousness is certainly less than that of typhoid fever, but tuberculosis furnishes its danger of infection for a much longer period—years instead of days. No one is so healthy or so strong that he may not at some time develop tuberculosis, although robust health is a most valuable safeguard. Probably all adults are able to withstand a few of the germs from time to time without becoming sick, but at certain times when the system is weakened by fatigue, privation, or intemperance, or by other diseases, such as measles, grip, or pneumonia, tuberculosis may develop. Constant attention to the details of prevention is necessary if children live with a consumptive. Even an occasional exposure to the infection has some danger, and it is needful to protect cars, boats, waiting rooms, restaurants, and all public places from infection by careless patients.

NATURE OF THE CONTAGION—THE TUBERCLE BACILLUS OR CONSUMPTION GERM.

The germ is called the tubercle bacillus because small rounded bodies (tubercles) occurring in the diseased tissue are characteristic of the disease. The bacillus is very small and can be seen only with a high-power microscope and the aid of coloring matters, but under certain conditions, when established in some organ of the body, usually the lungs, it multiplies and is produced in enormous numbers. Tubercle bacilli are given off in the sputum (phlegm, expectoration, spit) and it is estimated that the daily sputum of the ordinary consumptive contains many millions of these germs. Every tiny speck of his sputum abounds with them and, of course, they are frequently present in his mouth and ordinary saliva. He leaves them on the

spoon with which he eats, on the edge of his teacup or glass, and on the mouthpiece of his pipe. If he wets his finger with the tongue in turning the pages of a book he may leave tubercle bacilli on the printed sheets. If he wipes his lips with his fingers, or in coughing covers his mouth with the bare hand, then whatever he touches—food, door knobs, another person's hand, a baby's toy—may become smeared with tubercle bacilli which find their way to the lips of some other person. If he coughs with uncovered mouth he sprays forth a multitude of fine droplets, which contain tubercle bacilli in such a fine suspension of moisture that they may float in the air and be inhaled directly into the lungs by some one near him. If sputum dries upon his handkerchief or bedding anyone handling them may inhale the infected dust, which will also arise from carpet or floor which he has soiled. Flies carry his sputum on their feet from the gutter to fruit on near-by stands or to food upon the table. People carry his sputum on their shoes from the pavement into rooms where babies crawl. And whether inhaled in dust or swallowed with food, tubercle bacilli may cause tuberculosis of the lungs. It is doubtful which mode of entrance is more dangerous.

BOVINE TUBERCULOSIS.

Cattle are subject to this disease, and milk from infected cows often contains the bacilli. This variety of the germ seldom or never causes tuberculosis of the lungs in man, but does cause disease of the bones, joints, and glands. About 8 per cent of all deaths from tuberculosis are due to the bovine bacillus, most of the victims being children.

The obvious remedy is to use only certified milk from tuberculin-tested herds, or to boil or pasteurize suspicious milk. Pasteurized milk can be purchased in most cities. Its nutritive properties are not injured by the process and not only tubercle bacilli but other germs which may be present are killed.

FEAR OF THE DISEASE SHOULD BE BALANCED BY A PROPER KNOWLEDGE.

At present some few people do not know that the disease is contagious and disregard precautions, but far more people, having learned this fundamental fact, are merely filled with helpless terror and disgust, lacking knowledge to be helpful to others or to adequately protect themselves. We must make up our minds that we can not get away from the consumptive. There are more than a million of them now living in the United States, and it is our duty to teach or force them into proper habits and at the same time protect our children and ourselves from the most common sources of infection. This can be done. The antispitting laws now existing in most cities

should be backed up by a strong public sentiment. The viciously careless consumptive who daily exposes his family or neighbors to disease should be put under proper institutional control. We may hope soon to see laws enacted prohibiting the housing of young children with consumptives and requiring that one or the other shall be removed. The exclusion of persons having open tuberculosis from the vocations of dairymen, cooks, waiters, nursemaids, and teachers is also rational.

But the casual exposure can not be avoided, nor is it very dangerous to adults. Instead of devoting all our efforts toward escaping exposure, therefore, we should also endeavor to increase the resistance of our bodies so that infection from without will be harmless and latent infection kept innocuous.

TIME OF INFECTION.

There is a growing conviction that infection usually occurs in childhood. If a large number of bacilli are received at once or if the exposure is prolonged or the child very young, death may occur in a short time from general tuberculosis. The younger the child and the more intimate the contact and the more prolonged the exposure, the greater is this danger. About 10 per cent of all deaths among children under 15 are due to tuberculosis.

But the relation of early infection to tuberculosis in later life is also important. It is known that most people are infected before the age of 16. If a drop of tuberculin is rubbed into a slight abrasion in the skin of a person who has ever been infected with tubercle bacilli, slight redness and swelling appear within a day or two and persist for a short time. This test (the Von Pirquet tuberculin test) shows that infection is practically universal among healthy adults. It is known that tubercle bacilli may be present, alive but dormant, in a healthy person's lymphatic glands for many years. This constitutes a latent infection which becomes active and dangerous only when that person is overworked or underfed or housed in a debilitating atmosphere or when from dissipation, excessive amusements, or worry he suffers from physical or mental overstrain. This smoldering fire is apt to burst into flame after the system is exhausted by certain diseases, especially measles, whooping cough, influenza, pneumonia, typhoid fever, and diabetes. In such cases the bacilli are allowed to escape and infection is spread, usually to a lung, which is the most susceptible organ.

To the latent infection contracted in childhood many scientists attribute all adult tuberculosis. Others believe that adults, whether harboring latent infection or not, may be infected from without. Practically it is of no great consequence which theory is correct,

since all agree that in either case the adult must be in a condition of lowered resistance to develop the disease.

Thus it happens that tuberculosis is most common during those ages when men and women are putting forth their greatest physical and mental efforts. Between the ages of 20 and 40 about one-third of all deaths are due to it. It is most frequent among the poor because they can not avoid fatigue, nor nurse minor ailments, nor escape other diseases which predispose to infection, nor can they house or feed themselves in a manner to enhance resistance. The struggling student, the religious recluse, the roué and the rounder, the dissolute spendthrift, the miser, the ascetic, the chronically tired business man and the overamused society girl, as well as the poor, are predisposed to tuberculosis through unwise or unworthy exhaustion of physical resources.

TUBERCULOSIS IS A SLOW DISEASE—ONE DOES NOT DIE QUICKLY NOR RECOVER QUICKLY FROM IT.

Besides having an indefinite incubation period, the disease is usually slow in progress. A man may be able to continue his work for a year, or for many years, after he first becomes sick. One with early tuberculosis seldom feels very sick, does not look ill to his friends, and will follow his usual pursuits. He may even, under favorable circumstances, get well without ever knowing that he had tuberculosis. Very often a skillful physician after patient and careful examination makes the diagnosis of early tuberculosis; the patient after a few months presents himself to another doctor who is unable to find signs of the disease. There is nothing strange in this, for early cases are often cured by a few months' rest. It is more frequently cured than most people think and more common than was formerly believed, because only those cases which progressed to an advanced stage were called tuberculosis until a few years ago.

EARLY SYMPTOMS OF THE DISEASE NOT ALARMING.

While the symptoms of advanced tuberculosis can be recognized by almost anyone, early symptoms are not typical. Cough is not always present; sometimes a slight afternoon fever is the only symptom for months, and the patient may think he has malaria. A loss of weight and strength, rapid heartbeat, a sense of fatigue on slight exertion, loss of appetite or indigestion, with perhaps slight pains in the chest and hoarseness or cough, are the commonest symptoms of early tuberculosis. Bloody sputum, chills, night sweats, emaciation, the hectic flush, copious expectoration, and inability to work are usually late symptoms. Tubercle bacilli may be present very early or they may not be found until late in the disease. To make an early diagnosis

a skillful physician will sometimes need several weeks of close observation. The family physician can best do this, with perhaps one examination by some specialist whom the family doctor calls. Never consult a doctor who advertises in the papers or in any other way. A doctor who advertises is probably a quack who cares only for money, and in tuberculosis the patient has special need to rely on the honesty of his physician. For the poor in cities there are numerous dispensaries where they can be examined free of charge by the best medical talent.

EARLY DIAGNOSIS OF THE DISEASE VERY IMPORTANT.

The importance of an early diagnosis is twofold. In the first place, proper treatment at this time will usually effect a cure, and, in the second place, the early cases are often dangerous carriers of infection. A very slight cough may be bringing up thousands of the bacilli daily. A dry cough or a sneeze may spray hundreds of infected droplets of moisture from the mouth or nose while the patient may be unaware that he is carrying infection.

There is only one way to insure early diagnosis in all cases, and that is by frequent periodical physical examination. If opportunity were afforded, expert examiners could often diagnose tuberculosis several years before it is now commonly found, and early enough so that recovery could frequently be effected without recourse to sanatorium treatment and without protracted disability. Better still, development of the disease could often be forestalled by timely correction of unwise habits of living. There is no other reliable method of detecting early tuberculosis. A "snap" diagnosis is frequently wrong, since the flat chested and anemic are often not tuberculous, and those of robust appearance sometimes are. The X ray is only corroborative, and tuberculin tests are not very useful in the adult, although of importance in children under 2 years. The early diagnosis of pulmonary tuberculosis is assured only when a skillful physician has periodical opportunity to examine the bared chest in a warm, quiet room, to ascertain the daily temperature for a week or more, and to acquaint himself with the personal history of the case.

The fear of pain and a high regard for personal appearance cause most intelligent people to frequently seek a dentist for examination and correction of incipient dental troubles. A similar regard for one's general good health would prompt a complete examination of the body at least once a year. The physical examination of school children, now compulsory in some cities, is an excellent beginning. Some industrial concerns make periodical physical examination of their employees, well knowing that the principle of frequent in-

spection and timely repair is quite as applicable to the human machine as to their less valuable but better cared for engines of brass and steel.

TUBERCLE BACILLI WILL LIVE SEVERAL WEEKS IN SPUTUM OR IN DUST, ESPECIALLY IN DARK PLACES.

The tubercle bacillus when cast out in the sputum is not destroyed by rain or snow or by the lowest winter temperatures. In a dark room or hall it lives for months, but sunlight kills it in a few hours, and good, strong daylight in a well-lighted, clean room will destroy it in a few days. Dirt serves as an envelope to protect the bacillus from light, and so preserves it. Dust is a vehicle to convey the germs through the air, and rooms should never be swept dry, nor should a "duster" of feathers or cloth ever be used. A consumptive's floor should be without carpets, and is best cleaned by scrubbing with soap and water. A boiling temperature kills the bacillus in a few minutes, and boiling in water is one of the best ways to disinfect dishes, bedding, handkerchiefs, clothing, napkins, and towels which the patient has used. Carpets, rugs, and clothing, which would be injured by boiling, should be fumigated by sprinkling the articles well with formalin and then wrapping them up as nearly air-tight as possible in paper or inclosing them in a tight chest or small closet. They should be thus kept confined in the fumes of the formalin for 24 hours and then thoroughly aired.

ANTISEPTICS OR DISINFECTANTS SPRINKLED ABOUT THE ROOM ARE USELESS.

Antiseptics are of little practical use around the house. The practice of putting chloride of lime, formalin, carbolic acid, sulphur, or any other antiseptic into sinks or in basins placed in the sick room is useless. Germs, living in the air, in the dust on walls and carpets, or in the dirt in corners, are in no way affected by antiseptics placed in these basins. Moreover, no antiseptic solution sprinkled or mopped on floors, walls, or furniture is of any use unless all surfaces are kept soaked with it for several hours, and not then unless the dirt has been previously removed to allow the fluid access to the objects. Soap and water for floors and a wet cloth with which to wipe furniture are the best agents to combat infection. A vast amount of money is spent on much-advertised but worthless antiseptics. There is no antiseptic which has any practical value in the daily cleaning of a house. If the patient uses a spittoon or unburnable cup, however, 5 per cent carbolic acid or strong lye water should be placed in the container before it is given to the patient, and left there all day while he uses the article. There should be enough of it to equal the amount of sputum to be disinfected.

WATERPROOF PAPER CUPS, WHICH CAN BE BURNED, ARE THE BEST SPUTUM RECEIVERS.

By far the best way to dispose of sputum is to receive it into waterproof paper cups and then to burn cup and contents together in the fire. These cups are cheap, and can be bought in any size at most drug stores; small ones can be carried in the pocket or large ones placed near the bed. Paper handkerchiefs are best to hold in front of the mouth when coughing and to wipe the lips, after which they must be burned with the sputum cup. The immediate destruction of all sputum from consumptives is the most important thing in the fight against tuberculosis, and the promiscuous spitter should be regarded with suspicion and disapproval and punished promptly and severely. Tubercle bacilli are often present in sputum during the early stages of the disease when one feels perfectly well; and even though repeated examinations of sputum have failed to reveal them, it is never safe to presume on this evidence in a case suspected of being tuberculosis, as the bacilli may be absent one day and present the next. The habitual use of a spit cup by every spitter should be compulsory. For use on the street there are several forms of pocket cups, some of which can be concealed in a handkerchief and used without being seen. But we need to cultivate everywhere a sentiment in favor of the spit cup. The person who carries one deserves respect and approval; it shows a good citizen, a law abider, and one of clean habits.

TUBERCULOSIS IS ALWAYS A SERIOUS DISEASE IN ANY STAGE.

Tuberculosis is curable, but is a very serious disease no matter how slight the symptoms may be. Sometimes it is difficult to convince patients of this, as they often feel well and do not look sick; but when tuberculosis is diagnosed the subject should put himself unreservedly into the hands of his doctor. In no other serious disease is a sense of well-being so common or so deceptive, and until the disease has been under observation for perhaps a year it is never possible to tell how much lung tissue will be damaged or what the outcome will be.

TREATMENT: REST—AIR—FOOD.

Rest, pure air, and good food are the three essentials in treatment. Patients are no longer told to go West and rough it, because rest and good food are fully as necessary as fresh air. Rest in the open air is the ideal condition for recovery. A hammock out of doors, a bed on a porch, a mattress on the fire escape, or a pallet on a roof afford this condition. Rest means not only freedom from work, manual and mental, but the giving up of sports. A consumptive in any stage of

the disease should not walk, ride, row, play ball, tennis, golf, pool, billiards, or cards, except as permitted by a physician. The laboring man or woman with a family to support is at a disadvantage, but sometimes a little extra rest will throw the balance in their favor in a fight against the disease. Strict temperance, bed as many hours as possible out of the twenty-four, and complete rest all day Sunday, with conditions favorable for open-air sleeping, will sometimes enable an early case to effect a cure while working, but all work should certainly be given up if there is any possibility of honorably avoiding it.

PATENT MEDICINES USELESS AND DANGEROUS.

There is no drug known, however rare or expensive it may be, that has any special curative action on this disease, and all remedies advertised as such are to be avoided. Patent cough medicines are harmful; radium, X rays, or electricity in any of its forms have no special value in tuberculosis of the lungs. No serum has yet been found that will cure it, and there is no plaster or poultice which has any effect on the disease itself. There are many symptoms peculiar to each case which may require medicines, but what is good for one patient may be very bad for another, and a doctor should be in charge to prescribe all medicines taken and to regulate the patient's daily life.

HOSPITALS EXCELLENT FOR TREATING ADVANCED CASES.

If it becomes evident that the disease is progressing, then the consumptive should seek a hospital in his own city or town. A few weeks in bed from time to time when one is losing weight or having fever will often enable the patient to resume his work distinctly improved, and not only does a hospital offer the most favorable conditions for a cure, but by entering an institution danger of infecting members of the family is avoided. Few far advanced consumptives are capable of observing the necessary precautions around the house without considerable help. It is their duty to protect their relatives and friends from infection and at the same time to avail themselves of medical skill and superior accommodations found in a hospital which sometimes enable the most hopeless consumptive to arrest his disease.

CHANGE OF CLIMATE RARELY NECESSARY.

The reason why some climates are better than others for tuberculosis is that open-air sleeping and rest out of doors are more pleasant in some places on account of more agreeable temperature and greater frequency of sunshiny days. Cold weather in itself is not an objection, in fact, it is favorable in the treatment of tuberculosis. High altitude is of doubtful advantage and no longer urged for ordinary

cases. Most consumptives, rich or poor, prefer to remain near home, and they can almost always do this safely. The money which would be spent to send the patient to a distant State can often be used to much better advantage in constructing a place for open-air sleeping, in buying woolen underwear or bed comforts, and in providing milk, eggs, and other nourishing food. Most States and many cities have sanatoria or hospitals where patients may be treated, sometimes free of charge, and be near enough to their homes to see their friends frequently. An early case properly cared for will usually arrest his disease in any climate, while for a far advanced case rest, food, and nursing, which are more apt to be found near home than among strangers, are more important than a choice location.

NIGHT AIR IS GOOD FOR CONSUMPTIVES.

Sleeping out of doors or under conditions as nearly as possible like outdoors is very essential in the treatment of tuberculosis. No one need be afraid of night air; all outdoor air is good, whether it is sea or mountain air, city or country air, the air of pine woods, or that of the plains. In winter woolen bed slippers, heavy flannel night clothes, and perhaps a soft cap may be needed, but with a little experience one can sleep warm in the coldest weather even in Northern States. If it is not possible to find a porch or balcony to sleep on then a room with two or more windows, all of which must be wide open, should be selected. Not only at night but also by day the patient should live in the open air, either at rest, sitting or reclining, or taking light exercise as the doctor directs.

ADVICE TO THE SICK.

Keep bedroom windows open constantly and stay in bed both day and night until your temperature remains normal at all hours.

Take no medicine except that prescribed by your doctor; spend your money for food rather than drugs.

Drink no whisky, beer, or other liquors unless prescribed by your doctor.

Eat regularly and try to get fat; a gain in weight is most favorable. Plain food is much better than dainties; milk and eggs are good. Vegetables and bread and butter must not be omitted.

Take no exercise except as ordered by your doctor.

Never run; avoid getting tired; a long walk which brings you home exhausted may spoil the gain a whole week of rest has made.

Keep your feet warm and dry.

If you are offered admission to a hospital accept at once.

Do not seek another climate except by advice of your physician and with full knowledge of the living conditions in the proposed location.

When sufficiently recovered to work, return to your former employment unless it exposes you to dust, undue physical or mental fatigue or some other unhealthful condition.

Having recovered, remember that you may probably keep well even though working if you give up all play. Practice physical conservation.

* * * * * * *

Do not spit on the sidewalk or in your handkerchief or into anything except a spit cup.

Burn all your sputum before it dries.

Never swallow what you cough up.

Do not let flies get at your spit cup.

Hold a handkerchief or a paper napkin before the mouth when coughing or sneezing, and wipe the lips with it.

Have a large pocket with removable lining to keep soiled paper napkins in, or carry a paper bag for the purpose; burn them every night.

Wash face and hands several times daily and keep finger nails clean.

Do not allow your clothing or bedclothes to become soiled with sputum.

Have your own towel, soap, and drinking glass.

Scald your dishes and wash them separately.

Boil your handkerchiefs before adding them to the wash.

Sleep alone.

Wear neither beard nor mustache.

Carefully cleanse the teeth twice daily.

Never kiss anyone.

ADVICE TO THE WELL.

Keep in good physical condition all the time. Avoid excessive fatigue, but if a desk worker get some exercise every day.

Cultivate a proper carriage of the body.

Breathe through the nose and practice deep breathing in the open air several times every day.

Bathe frequently; a cold sponge bath every morning will help ward off colds. Avoid hot rooms.

Sleep with windows open; spend several hours outdoors every day; and keep the room well aired where you live, work, or study.

Promptly treat any sickness; do not try to work it off.

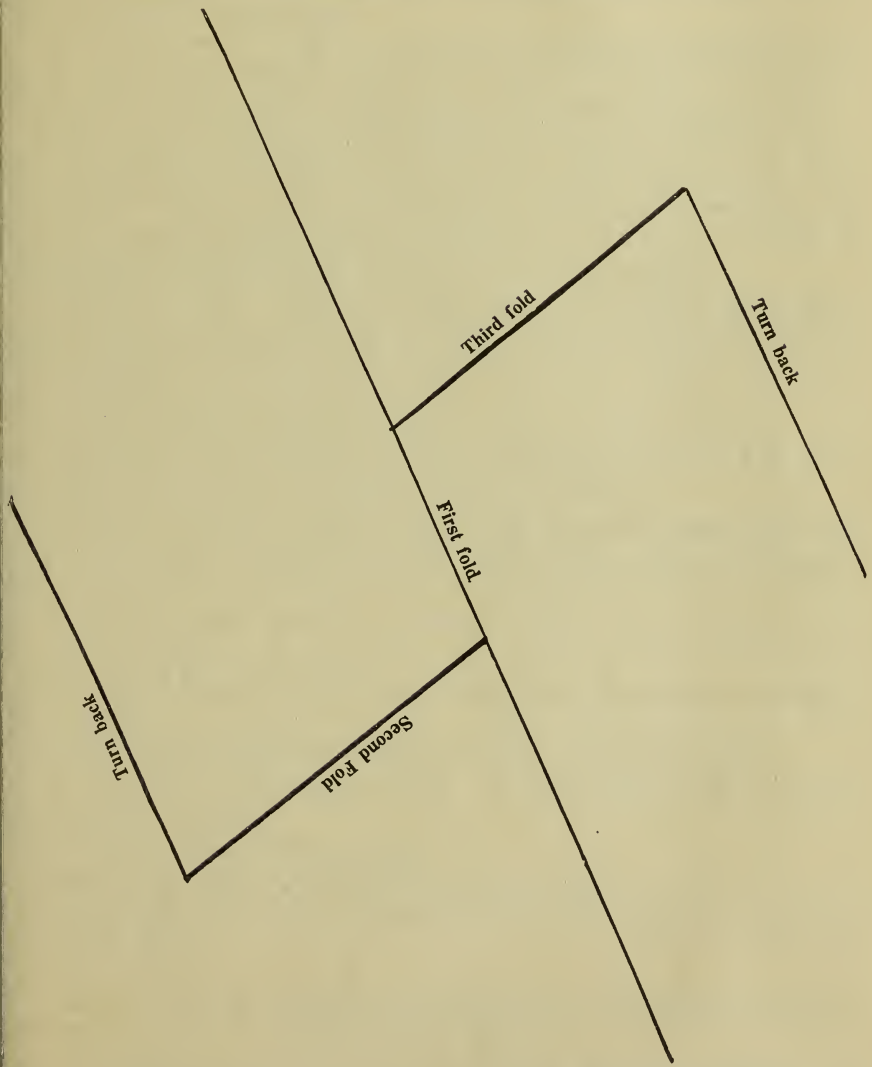
Sleep nine hours every night, eat regularly and slowly, and be temperate in all things.

Do not move into a house vacated by a consumptive until it has been well cleaned and disinfected, or repainted and repapered.

Do not work in a shop or office which is dusty or poorly ventilated.

Never use a common drinking cup at a public fountain.

MAKE YOUR OWN DRINKING CUP—IT'S THE SANITARY WAY.



A PIECE OF CLEAN PAPER 8 INCHES SQUARE IS ALL YOU NEED.
A SIMPLE MATTER TO FOLD.

Report the promiscuous spitter.

Have your lungs examined once a year.

Regard any cough lasting more than three weeks with suspicion.

Buy a clinical thermometer and when in doubt watch your afternoon temperature. A daily rise of more than half a degree, except after exercise, is suspicious.

Remember that tuberculosis is the most common of all serious diseases and that it may simulate the common cold, asthma, malaria, rheumatism, neurasthenia, dyspepsia, and a host of other ailments.

When your doctor is in doubt about the diagnosis, retrench, economize on physical expenditures for a month or two, give up all exercise, retire at 6 p. m., stay in bed all day Sundays and holidays, remove to a cooler, larger, better ventilated room or house, take extra nourishment, and shorten your hours of work if possible.

Practice no fads. If possible rest when tired, sleep when sleepy, and eat three good meals daily in which butter and other fats, fresh meat, eggs, or other proteids, vegetables, bread, sugar, and other carbohydrates are all represented.

Give your child absolute protection. Do not allow him to live in the same house nor visit the room of a consumptive, nor be kissed or handled by the sick or by those of unknown health.

Do not allow him to place in his mouth anything taken from the mouth of another person, such as a whistle, horn, candy, or partly-eaten fruit.

Protect him to the uttermost until late childhood from measles and whooping cough.

See that he sleeps 10 hours every night and as late each morning as he wishes.

Insist upon his eating sufficiently of plain, wholesome food.

Use certified or pasteurized milk. A tuberculous mother should never nurse her baby.

Provide an outdoor playground.

Oppose child labor, both in factory and at home.

Care for the teeth, have adenoids removed, and cooperate with the school physician.

REGULATIONS TO PREVENT THE SPREAD OF TUBERCULOSIS IN GOVERNMENT BUILDINGS, OFFICES, AND WORKSHOPS.[1]

1. All persons in Government employ are positively forbidden to spit upon the floors.

2. Rooms, hallways, corridors, and lavatories shall be freely aired and effectually cleaned at least once a day and not during working hours.

3. Spittoons shall receive a daily cleansing with very hot water and when placed ready for use must contain a small quantity of water.

[1] Prepared by the Committee on Prevention of Tuberculosis in Government buildings in accordance with Executive Order of December 7, 1905.

4. Dust must be removed as completely as possible by means of dampened cloths or mops. It should never be needlessly stirred up by a broom or duster, as this practice only spreads the dust and germs.

5. Floors of tiling, brick, or stone must be frequently scoured with soap and water.

6. The senior clerks in charge of workrooms will take measures to secure during working hours the admission of as much fresh air and sunshine as the conditions will permit.

7. The use of individual drinking glasses is recommended.

8. Persons in Government employ who suffer from pulmonary tuberculosis shall when possible be separated from others while at work.

9. Such persons will not be permitted to use the public spittoons, but must provide themselves with individual sputum receivers, preferably of easily destructible material, and carry these with them on arrival and on departure. They will be held strictly responsible for the disposal and destruction of their own sputum, so that no other person's health may be endangered therefrom.

10. Such persons must provide their own drinking glasses, soap, and towels, and shall not use those provided for the general use.

11. Plainly printed notices, reading as follows: "DO NOT SPIT OF THE FLOOR; TO DO SO MAY SPREAD DISEASE," shall be prominently posted in rooms, hallways, corridors, and lavatories of public buildings.

PUBLICATIONS ON TUBERCULOSIS.

(Literature bearing upon tuberculosis issued by the United States Public Health Service. Most of the bulletins and reprints here listed may be obtained without charge by applying to the United States Public Health Service, Washington, D. C.; those publications marked "Exhausted," however, may be obtained only from the Superintendent of Documents, Washington, D. C., at the price specified.)

HYGIENIC LABORATORY BULLETINS.

57. I. The Presence of Tubercle Bacilli in the Circulating Blood in Clinical and Experimental Tuberculosis. By John F. Anderson. II. The Viability of the Tubercle Bacillus. By M. J. Rosenau. September, 1909. Exhausted. 5 cents.

99. The Friedmann Treatment for Tuberculosis: A report of the board appointed for its investigation. By John F. Anderson and Arthur M. Stimson. October, 1914. Exhausted. 10 cents.

101. I. Complement Fixation in Tuberculosis. By A. M. Stimson. (Other papers in this bulletin not on tuberculosis.)

PUBLIC HEALTH BULLETINS.

35. The Relation of Climate to the Treatment of Pulmonary Tuberculosis. By F. C. Smith. Revised Edition. October, 1916.

36. Tuberculosis: Its Nature and Prevention. By F. C. Smith. Revised Edition. November, 1917.

53. Studies of Plague and Tuberculosis Among Rodents in California. VI. A note on the susceptibility of ground squirrels (*Citellus Beechyi*, Richardson) to tuberculosis. By George W. McCoy and Charles W. Chapin. January, 1912. Exhausted. 5 cents.

58. Open-Air Schools for the Cure and Prevention of Tuberculosis among Children. By B. S. Warren. October, 1912. Exhausted. 15 cents.

60. Rules to be Observed by Tuberculous Patients. By F. C. Smith. January 1913. Exhausted. 5 cents.

73. Tuberculosis Among Industrial Workers: Report of an investigation made in Cincinnati, with special reference to predisposing causes. By D. E. Robinson and J. G. Wilson. March, 1916.

REPRINTS FROM THE PUBLIC HEALTH REPORTS.

39. A Working Plan for Colored Antituberculosis Leagues. By C. P. Wertenbaker. September 3, 1909. Exhausted. 5 cents.

51. Pulmonary Hemorrhage in the Tuberculous at High Altitude (6,200 feet); Report of 56 Deaths; Frequency of Associated Heart Disease. By F. C. Smith. October 7, 1910. Exhausted. 5 cents.

93. The Public Health Service Tuberculosis Sanitarium at Fort Stanton. By F. C. Smith. August 30, 1912.

125. The Friedmann Treatment for Tuberculosis: A report on the present status of its investigation by a board of officers of the Public Health Service. May 16, 1913.

145. Tuberculosis Sanatorium, Fort Stanton, N. Mex.: A report for the year ended June 30, 1913, of the sanatorium maintained by the Public Health Service for the treatment of tuberculous patients. By F. C. Smith. October 17, 1913.

158. Tuberculosis in Switzerland: Results of the campaign against the disease. By W. C. Rucker and R. A. Kearny. December 28, 1913.

216. Tuberculosis Sanatorium, Fort Stanton, N. Mex.: A report for the year ended June 30, 1914, of the sanatorium maintained by the Public Health Service for the treatment of tuberculous patients. By F. C. Smith. August 28, 1914.

221. Tuberculosis: The financial aspect of the sick leaving home in search of a beneficial climate. By Thompson Frazier. September 18, 1914.

243. The Tuberculosis Problem in Rural Communities: Its modern aspect and the duty of health officers. By A. Adolphus Knopf. December 18, 1914. Exhausted. 5 cents.

246. Tuberculosis: The home hospital treatment. By Donald B. Armstrong. January 18, 1914. Exhausted. 5 cents.

249. The Spread of Tuberculosis: Report on the spread of infection in certain tuberculous families in five counties in Minnesota. H. G. Lampson, January 8, 1915. Exhausted. 5 cents.

265. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with special reference to the States of North and South Carolina. By A. D. Foster. March 12, 1915.

266. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with reference to the State of California. By P. M. Carrington. March 19, 1915.

269. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with special reference to the States of Texas and New Mexico. By Ernest A. Sweet. April 9, 16, and 23, 1915.

282. Tuberculosis: The municipal care and supervision of the tuberculous. June 18, 1915.

283. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with special reference to the States of Arizona and Colorado. By A. J. Lanza. June 18, 1915.

309. Tuberculosis, with special reference to its epidemiology, transmissibility and prevention. By George M. Kober. October 29, 1915.

356. The Sanitation of Railway Cars. By Thomas R. Crowder. August 11, 1916.

387. Climate and Tuberculosis: The relation of climate to recovery. By John W. Trask. February 23, 1917.

SUPPLEMENTS TO THE PUBLIC HEALTH REPORTS.

3. Tuberculosis: Its predisposing causes. By F. C. Smith. February 7, 1913.
26. Public Health Administration in Richmond, Ind. A report of a survey to determine the incidence of tuberculosis. By J. C. Perry. October 8, 1915.

RELATED PUBLICATIONS.

(As the prevention of tuberculosis depends so much on personal hygiene a number of more general publications are given herewith. These may be obtained without charge by applying to the United States Public Health Service, Washington, D. C.)

PUBLIC HEALTH BULLETINS.

69. Typhoid Fever: Its Causation and Prevention. By L. L. Lumsden. May, 1915.
76. Health Insurance: Its Relation to the Public Health. By B. S. Warren and Edgar Sydenstricker. March, 1916.
78. Influence of Occupation on Health During Adolescence. Report of a physical examination of 679 female minors under 18 in the cotton industries of Massachusetts.

REPRINTS FROM PUBLIC HEALTH REPORTS.

100. Whooping Cough—Its Nature and Prevention: A popular discussion of a widespread and dangerous disease for which familiarity has bred contempt. By W. C. Rucker. October 25, 1912.
116. Country Schools and Rural Sanitation. Six sample public schools in one county. Does this county need medical inspection in its schools? The country school-teacher. By Ch. Wardell Stiles. February 7, 1913.
150. The Citizen and the Public Health: The individual's relation to the health of the community. By John W. Trask. November 7, 1913.
195. Industrial Conditions: Their Relation to the Public Health. By B. S. Warren. May 29, 1914.
197. Industrial Insurance: Medical examination of employees and prevention of sickness its proper foundation. By J. W. Schereschewsky. June 5, 1914.
234. Physical Examination of Workers. By J. W. Schereschewsky. November 20, 1914.
250. Sickness Insurance: Its relation to public health and the common welfare. By B. S. Warren. January 8, 1915.
287. The Practical Use of Disinfectants. By H. E. Hasseltine. July 2, 1915.
306. Lung Capacity of Children: Spirometer tests of 1,618 white school children (751 boys; 867 girls) in the city of X. By C. W. Stiles and Floyd Graves. October 15, 1915.

SUPPLEMENTS TO THE PUBLIC HEALTH REPORTS.

1. Measles: By W. C. Rucker. January 24, 1913.
2. Indoor Tropics: The injurious effect of overheated dwellings, schools, etc. By J. M. Eager. January 31, 1913.
5. Fighting Trim: The importance of right living. By J. M. Eager. March 14, 1913.
10. The Care of the Baby: Prepared by a committee of the American Association for the Study and Prevention of Infant Mortality and presented to the association at its annual meeting held in Washington, D. C., November 14–17, 1913. December 19, 1913.
14. Diphtheria: Its Prevention and Control. By J. W. Schereschewsky. April 17, 1914.
24. Exercise and Health. By F. C. Smith. May 7, 1915.

○

14.09
Un3m
no.27
1924

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 27

TUBERCULOSIS

ITS NATURE AND PREVENTION

By
F. C. SMITH
Surgeon, U. S. Public Health Service

THE LIBRARY OF THE
OCT 24 1924
UNIVERSITY OF ILLINOIS

Prepared by direction of the Surgeon General

[EDITION OF MAY, 1924]

WASHINGTON
GOVERNMENT PRINTING OFFICE
1924

ADDITIONAL COPIES

OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT

5 CENTS PER COPY

614.09
Am3m
no.27
1924

TUBERCULOSIS: ITS NATURE AND PREVENTION

By Surgeon F. C. Smith

"It is in the power of man to cause all parasitic (germ) diseases to disappear from the world."—Pasteur

The campaign against tuberculosis is showing results. The death rate from tuberculosis has been greatly reduced in the last 20 years. Improved living conditions have helped to reduce this disease. Better houses for the working man and woman, better care of young children, less work for growing children, better food for all classes of people, have been helpful. Tuberculosis is still, however, one of the most important diseases we have to combat, causing more than 100,000 deaths each year in the United States.

Tuberculosis is most common in persons between the ages of 20 and 50, at which time people are most free from other diseases. This, moreover, is the money-earning period of life, and the sickness due to tuberculosis is an important cause of poverty. Tuberculosis is preventable, but it can not be suppressed by health authorities like scarlet fever or smallpox, because it is too common and too chronic. Each family must be taught how to meet the danger, and each person must learn how to protect himself against infection. If everyone—men, women, and children—will learn the important facts about tuberculosis and the means for its prevention, the next few years will witness a continued decrease in the disease, and the coming generation may see its way clear to complete freedom from it.

TUBERCULOSIS OF THE LUNGS (CONSUMPTION, PHTHISIS, PULMONARY TUBERCULOSIS) CAUSES MORE DEATHS THAN ANY OTHER DISEASE EXCEPT HEART DISEASE

While tuberculosis is most common in young adult life, it may occur at any age. When babies have it, the intestines or membranes of the brain are parts frequently attacked, and death follows from peritonitis or tuberculous meningitis. Tuberculosis of the bones is common in children, and disease of the knee or hip joint or spine is usually tuberculous. It may attack any part of the body, and there is a form in which it occurs in many organs simultaneously, the patient

dying of general tuberculosis. But the form in which the disease most commonly occurs at all ages is tuberculosis of the lungs; about nine-tenths of all the deaths from tuberculosis are due to this variety.

IT IS TRANSMITTED FROM THE SICK TO THE WELL

Tuberculosis is a contagious disease. Every existing case contracted it by breathing in or swallowing the germs which cause it. It is probably never inherited. Children of consumptive patients often become tuberculous because they have lived in an infected house and have inhaled and swallowed the germs repeatedly. It is not intensely contagious, like measles and scarlet fever; it is not contracted by merely coming in contact with a consumptive, nor even by living in the house with him, if he is careful and clean. It requires an intimate exposure to the disease, such as occurs when one sleeps with a consumptive, uses the same drinking cup, dishes, or towel, or shares a living room day after day with a careless patient, who spits on the floor or coughs with uncovered mouth. Its contagiousness is certainly less than that of typhoid fever, but tuberculosis furnishes its danger of infection for a much longer period—years instead of days. No one is so healthy or so strong that he may not at some time develop tuberculosis, although robust health is a most valuable safeguard. Probably all adults are able to withstand a few of the germs from time to time without becoming sick, but at certain times when the system is weakened by fatigue, privation, or intemperance, or by other diseases, such as measles, grip, or pneumonia, tuberculosis may develop. Constant attention to the details of prevention is necessary if children live with a consumptive. Even an occasional exposure to the infection has some danger to children and it is needful to protect cars, boats, waiting rooms, restaurants, and all public places from infection by careless patients.

NATURE OF THE CONTAGION—THE TUBERCLE BACILLUS OR CONSUMPTION GERM

The germ is called the tubercle bacillus because small rounded bodies (tubercles) occurring in the diseased tissue are characteristic of the disease. The bacillus is very small and can be seen only with a high-power microscope and the aid of coloring matters, but under certain conditions, when established in some organ of the body, usually the lungs, it multiplies and is produced in enormous numbers. Tubercle bacilli are given off in the sputum (phlegm, expectoration, spit) and it is estimated that the daily sputum of the ordinary consumptive contains many millions of these germs. Every tiny speck of his sputum abounds with them and, of course, they are frequently present in his mouth and ordinary saliva. He leaves them

on the spoon with which he eats, on the edge of his teacup or glass, and on the mouthpiece of his pipe. If he wets his finger with the tongue in turning the pages of a book he may leave tubercle bacilli on the printed sheets. If he wipes his lips with his fingers, or in coughing covers his mouth with the bare hand, then whatever he touches—food, door knobs, another person's hand, a baby's toy—may become smeared with tubercle bacilli which find their way to the lips of some other person. If he coughs with uncovered mouth he sprays forth a multitude of fine droplets, which contain tubercle bacilli in such a fine suspension of moisture that they may float in the air and be inhaled directly into the lungs by some one near him. If sputum dries upon his handkerchief or bedding anyone handling them may inhale the infected dust, which will also arise from carpet or floor which he has soiled. Flies carry his sputum on their feet from the gutter to fruit on near-by stands or to food upon the table. People carry his sputum on their shoes from the pavement into rooms where babies crawl. And whether inhaled in dust or swallowed with food, tubercle bacilli may cause tuberculosis of the lungs. It is doubtful which mode of entrance is the more dangerous.

BOVINE TUBERCULOSIS

Cattle are subject to this disease, and milk from infected cows often contains the bacilli. This variety of the germ seldom or never causes tuberculosis of the lungs in man, but does cause disease of the bones, joints, and glands. About 8 per cent of all deaths from tuberculosis are due to the bovine bacillus, most of the victims being children.

The obvious remedy is to use only certified milk from tuberculin-tested herds, or to boil or Pasteurize suspected milk. Pasteurized milk can be purchased in most cities. Its nutritive properties are not injured by the process and not only tubercle bacilli but other germs which may be present are killed.

FEAR OF THE DISEASE SHOULD BE BALANCED BY A PROPER KNOWLEDGE

At present some few people do not know that the disease is contagious and disregard precautions, but far more people, having learned this fundamental fact, are merely filled with helpless terror and disgust, lacking knowledge to be helpful to others or to adequately protect themselves. We must make up our minds that we can not get away from the consumptive. There are more than a million of them now living in the United States, and it is our duty to teach or force them into proper habits and at the same time protect our children and ourselves from the most common sources of infection. This can be done. The antispitting laws now existing in most cities

should be backed up by a strong public sentiment. The viciously careless consumptive who daily exposes his family or neighbors to disease should be put under proper institutional control. We may hope soon to see laws enacted prohibiting the housing of young children with consumptives and requiring that one or the other shall be removed. The exclusion of persons having open tuberculosis from the vocations of dairymen, cooks, waiters, nursemaids, and teachers is also rational.

But the casual exposure can not be avoided, nor is it very dangerous to adults. Instead of devoting all our efforts toward escaping exposure, therefore, we should also endeavor to increase the resistance of our bodies so that infection from without will be harmless and latent infection kept innocuous.

TIME OF INFECTION

There is a growing conviction that infection usually occurs in childhood. If a large number of bacilli are received at once or if the exposure is prolonged or the child very young, death may occur in a short time from general tuberculosis. The younger the child and the more intimate the contact and the more prolonged the exposure, the greater is this danger. About 10 per cent of all deaths among children under 15 are due to tuberculosis.

But the relation of early infection to tuberculosis in later life is also important. It is known that most people are infected before the age of 16. If a drop of tuberculin is rubbed into a slight abrasion in the skin of a person who has ever been infected with tubercle bacilli, slight redness and swelling appear within a day or two and persist for a short time. This test (the Von Pirquet tuberculin test) shows that infection is practically universal among healthy adults. It is known that tubercle bacilli may be present, alive but dormant, in a healthy person's lymphatic glands for many years. This constitutes a latent infection which becomes active and dangerous only when that person is overworked or underfed or housed in a debilitating atmosphere or when from dissipation, excessive amusements, or worry he suffers from physical or mental overstrain. This smoldering fire is apt to burst into flame after the system is exhausted by certain diseases, especially measles, whooping cough, influenza, pneumonia, typhoid fever, and diabetes. In such cases the bacilli are allowed to escape and infection is spread, usually to a lung, which is the most susceptible organ.

To the latent infection contracted in childhood many scientists attribute all adult tuberculosis. Others believe that adults, whether harboring latent infection or not, may be infected from without. Practically it is of no great consequence which theory is correct,

since all agree that in either case the adult must be in a condition of lowered resistance to develop the disease.

Thus it happens that tuberculosis is most common during those ages when men and women are putting forth their greatest physical and mental efforts. Between the ages of 20 and 40 about one-third of all deaths are due to it. It is most frequent among the poor because they can not avoid fatigue, nor nurse minor ailments, nor escape other diseases which predispose to infection, nor can they house or feed themselves in a manner to enhance resistance. The struggling student, the religious recluse, the roué and the rounder, the dissolute spendthrift, the miser, the ascetic, the chronically tired business man and the overamused society girl, as well as the poor, are predisposed to tuberculosis through unwise or unworthy exhaustion of physical resources.

TUBERCULOSIS IS A SLOW DISEASE—ONE DOES NOT DIE QUICKLY NOR RECOVER QUICKLY FROM IT

Besides having an indefinite incubation period, the disease is usually slow in progress. A man may be able to continue his work for a year, or for many years, after he first becomes sick. One with early tuberculosis seldom feels very sick, does not look ill to his friends, and will follow his usual pursuits. He may even, under favorable circumstances, get well without ever knowing that he had tuberculosis. Very often a skillful physician after patient and careful examination makes the diagnosis of early tuberculosis; the patient after a few months presents himself to another doctor who is unable to find signs of the disease. There is nothing strange in this, for early cases are often cured by a few months' rest. It is more frequently cured than most people think and more common than was formerly believed, because only those cases which progressed to an advanced stage were called tuberculosis until a few years ago.

EARLY SYMPTOMS OF THE DISEASE NOT ALARMING

While the symptoms of advanced tuberculosis can be recognized by almost anyone, early symptoms are not typical. Cough is not always present; sometimes a slight afternoon fever is the only symptom for months, and the patient may think he has malaria. A loss of weight and strength, rapid heartbeat, a sense of fatigue on slight exertion, loss of appetite or indigestion, with perhaps slight pains in the chest and hoarseness or cough, are the commonest symptoms of early tuberculosis. Bloody sputum, chills, night sweats, emaciation, the hectic flush, copious expectoration, and inability to work are usually late symptoms. Tubercle bacilli may be present very early or they may not be found until late in the disease. To make an early diagnosis a skillful physician will sometimes need several weeks of close ob-

servation. The family physician can best do this, with perhaps one examination by some specialist whom the family doctor calls. Never consult a doctor who advertises in the papers or in any other way. A doctor who advertises is probably a quack who cares only for money, and in tuberculosis the patient has special need to rely on the honesty of his physician. For the poor in cities there are numerous dispensaries where they can be examined free of charge by the best medical talent.

EARLY DIAGNOSIS OF THE DISEASE VERY IMPORTANT

The importance of an early diagnosis is twofold. In the first place, proper treatment at this time will usually effect a cure, and, in the second place, the early cases are often dangerous carriers of infection. A very slight cough may be bringing up thousands of the bacilli daily. A dry cough or a sneeze may spray hundreds of infected droplets of moisture from the mouth or nose while the patient may be unaware that he is carrying infection.

There is only one way to insure early diagnosis in all cases, and that is by frequent periodical physical examination. If opportunity were afforded, expert examiners could often diagnosis tuberculosis several years before it is now commonly found, and early enough so that recovery could frequently be effected without recourse to sanatorium treatment and without protracted disability. Better still, development of the disease could often be forestalled by timely correction of unwise habits of living. There is no other reliable method of detecting early tuberculosis. A "snap" diagnosis is frequently wrong, since the flat chested and anemic are often not tuberculous, and those of robust appearance sometimes are. The X ray is only corroborative, and tuberculin tests are not very useful in the adult, although of importance in children under 2 years. The early diagnosis of pulmonary tuberculosis is assured only when a skillful physician has periodical opportunity to examine the bared chest in a warm, quiet room, to ascertain the daily temperature for a week or more, and to acquaint himself with the personal history of the case.

The fear of pain and a high regard for personal appearance cause most intelligent people to frequently seek a dentist for examination and correction of incipient dental troubles. A similar regard for one's general good health would prompt a complete examination of the body at least once a year. The physical examination of school children, now compulsory in some cities, is an excellent beginning. Some industrial concerns make periodical physical examination of their employees, well knowing that the principle of frequent inspection and timely repair is quite as applicable to the human machine as to their less valuable but better cared for engines of brass and steel.

TUBERCLE BACILLI WILL LIVE SEVERAL WEEKS IN SPUTUM OR IN DUST, ESPECIALLY IN DARK PLACES

The tubercle bacillus when cast out in the sputum is not destroyed by rain or snow or by the lowest winter temperatures. In a dark room or hall it lives for months, but sunlight kills it in a few hours, and good, strong daylight in a well-lighted, clean room will destroy it in a few days. Dirt serves as an envelope to protect the bacillus from light, and so preserves it. Dust is a vehicle to convey the germs through the air, and rooms should never be swept dry, nor should a "duster" of feathers or cloth ever be used. A consumptive's floor should be without carpets, and is best cleaned by scrubbing with soap and water. A boiling temperature kills the bacillus in a few minutes, and boiling in water is one of the best ways to disinfect dishes, bedding, handkerchiefs, clothing, napkins, and towels which the patient has used. Carpets, rugs, and clothing, which would be injured by boiling, should be fumigated by sprinkling the articles well with formalin and then wrapping them up as nearly air-tight as possible in paper or inclosing them in a tight chest or small closet. They should be thus kept confined in the fumes of the formalin for 24 hours and then thoroughly aired.

ANTISEPTICS OR DISINFECTANTS SPRINKLED ABOUT THE ROOM ARE USELESS

Antiseptics are of little practical use around the house. The practice of putting chloride of lime, formalin, carbolic acid, sulphur, or any other antiseptic into sinks or in basins placed in the sick room is useless. Germs, living in the air, in the dust on walls and carpets, or in the dirt in corners, are in no way affected by antiseptics placed in these basins. Moreover, no antiseptic solution sprinkled or mopped on floors, walls, or furniture is of any use unless all surfaces are kept soaked with it for several hours, and not then unless the dirt has been previously removed to allow the fluid access to the objects. Soap and water for floors and a wet cloth with which to wipe furniture are the best agents to combat infection. A vast amount of money is spent on much-advertised but worthless antiseptics. There is no antiseptic which has any practical value in the daily cleaning of a house. If the patient uses a spittoon or unburnable cup, however, 5 per cent carbolic acid or strong lye water should be placed in the container before it is given to the patient, and left there all day while he uses the article. There should be enough of it to equal the amount of sputum to be disinfected.

WATERPROOF PAPER CUPS, WHICH CAN BE BURNED, ARE THE BEST SPUTUM RECEIVERS

By far the best way to dispose of sputum is to receive it into waterproof paper cups and then to burn cup and contents together in the

fire. These cups are cheap, and can be bought in any size at most drug stores; small ones can be carried in the pocket or large ones placed near the bed. Paper handkerchiefs are best to hold in front of the mouth when coughing and to wipe the lips, after which they must be burned with the sputum cup. The immediate destruction of all sputum from consumptives is the most important thing in the fight against tuberculosis, and the promiscuous spitter should be regarded with suspicion and disapproval and punished promptly and severely. Tubercle bacilli are often present in sputum during the early stages of the disease when one feels perfectly well; and even though repeated examinations of sputum have failed to reveal them, it is never safe to presume on this evidence in a case suspected of being tuberculosis, as the bacilli may be absent one day and present the next. The habitual use of a spit cup by every spitter should be compulsory. For use on the street there are several forms of pocket cups, some of which can be concealed in a handkerchief and used without being seen. But we need to cultivate everywhere a sentiment in favor of the spit cup. The person who carries one deserves respect and approval; it shows a good citizen, a law abider, and one of clean habits.

TUBERCULOSIS IS ALWAYS A SERIOUS DISEASE IN ANY STAGE

Tuberculosis is curable, but is a very serious disease no matter how slight the symptoms may be. Sometimes it is difficult to convince patients of this, as they often feel well and do not look sick; but when tuberculosis is diagnosed the subject should put himself unreservedly into the hands of his doctor. In no other serious disease is a sense of well-being so common or so deceptive, and until the disease has been under observation for perhaps a year it is never possible to tell how much lung tissue will be damaged or what the outcome will be.

TREATMENT: REST—AIR—FOOD

Rest, pure air, and good food are the three essentials in treatment. Patients are no longer told to go West and rough it, because rest and good food are fully as necessary as fresh air. Rest in the open air is the ideal condition for recovery. A hammock out of doors, a bed on a porch, a mattress on the fire escape, or a pallet on a roof afford this condition. Rest means not only freedom from work, manual and mental, but the giving up of sports. A consumptive in any stage of the disease should not walk, ride, row, play ball, tennis, golf, pool, billiards, or cards, except as permitted by a physician. The laboring man or woman with a family to support is at a disadvantage, but sometimes a little rest will throw the balance in his favor in a fight against the disease. Strict temperance, bed as many

hours as possible out of the 24 and complete rest all day Sunday, with conditions favorable for open-air sleeping, will sometimes enable an early case to effect a cure while working, but all work should certainly be given up if there is any possibility of honorably avoiding it.

PATENT MEDICINES USELESS AND DANGEROUS

There is no drug known, however rare or expensive it may be, that has any special curative action on this disease, and all remedies advertised as such are to be avoided. Patent cough medicines are harmful; radium, X rays, or electricity in any of its forms have no special value in tuberculosis of the lungs. No serum has yet been found that will cure it, and there is no plaster or poultice which has any effect on the disease itself. There are many symptoms peculiar to each case which may require medicines, but what is good for one patient may be very bad for another, and a doctor should be in charge to prescribe all medicines taken and to regulate the patient's daily life.

HOSPITALS EXCELLENT FOR TREATING ADVANCED CASES

If it becomes evident that the disease is progressing, then the consumptive should seek a hospital in his own city or town. A few weeks in bed from time to time when one is losing weight or having fever will often enable the patient to resume his work distinctly improved, and not only does a hospital offer the most favorable conditions for a cure but by entering an institution, danger of infecting members of the family is avoided. Few far advanced consumptives are capable of observing the necessary precautions around the house without considerable help. It is their duty to protect their relatives and friends from infection and at the same time to avail themselves of medical skill and superior accommodations found in a hospital which sometimes enable the most hopeless consumptive to arrest his disease.

There is no good reason why any hospital should not admit tuberculous patients to special wards or rooms for a temporary period. It is less difficult to prevent the infection of others from tuberculosis than from typhoid fever or septic conditions and many other diseases commonly found in general hospitals. It is desirable for general medical and surgical hospitals of all kinds to admit tuberculous patients, because these hospitals would then provide means for training internes and other local physicians in the diagnosis and treatment of tuberculosis. Such a custom would often enable a patient to be placed under treatment immediately in a local hospital instead of waiting for several months for a vacancy in some remote sanatorium. It would also tend to promote confidence

in the local climate and combat the too prevalent custom of sending patients away to some distant resort.

CHANGE OF CLIMATE RARELY NECESSARY

The reason why some climates are better than others for tuberculosis is that open-air sleeping and rest out of doors are more pleasant in some places on account of more agreeable temperature and greater frequency of sunshiny days. Cold weather in itself is not an objection; in fact, it is favorable in the treatment of tuberculosis. High altitude is of doubtful advantage and no longer urged for ordinary cases. Most consumptives, rich or poor, prefer to remain near home, and they can almost always do this safely. The money which would be spent to send the patient to a distant State can often be used to much better advantage in constructing a place for open-air sleeping, in buying woolen underwear or bed comforts, and in providing milk, eggs, and other nourishing food. Most States and many cities have sanatoria or hospitals where patients may be treated, sometimes free of charge, and be near enough to their homes to see their friends frequently. An early case properly cared for will usually arrest his disease in any climate, while for a far advanced case rest, food, and nursing, which are more apt to be found near home than among strangers, are more important than a choice location.

NIGHT AIR IS GOOD FOR CONSUMPTIVES

Sleeping out of doors or under conditions as nearly as possible like outdoors is very essential in the treatment of tuberculosis. No one need be afraid of night air; all outdoor air is good, whether it is sea or mountain air, city or country air, the air of pine woods, or that of the plains. In winter woolen bed slippers, heavy flannel night clothes, and perhaps a soft cap may be needed, but with a little experience one can sleep warm in the coldest weather even in northern States. If it is not possible to find a porch or balcony to sleep on then a room with two or more windows, all of which must be wide open, should be selected. Not only at night but also by day the patient should live in the open air, either at rest, sitting or reclining, or taking light exercise as the doctor directs.

ADVICE TO THE SICK

Keep bedroom windows open constantly and stay in bed both day and night until your temperature remains normal at all hours.

Take no medicine except that prescribed by your doctor; spend your money for food rather than drugs.

Drink no whisky, beer, or other liquors unless prescribed by your doctor.

Eat regularly and try to get fat; a gain in weight is most favorable. Plain food is much better than dainties; milk and eggs are good. Vegetables and bread and butter must not be omitted.

Take no exercise except as ordered by your doctor.

Never run; avoid getting tired; a long walk which brings you home exhausted may spoil the gain a whole week of rest has made.

Keep your feet warm and dry.

If you are offered admission to a hospital accept at once.

Do not seek another climate except by advice of your physician and with full knowledge of the living conditions in the proposed location.

When sufficiently recovered to work, return to your former employment unless it exposes you to dust, undue physical or mental fatigue or some other unhealthful condition.

Having recovered, remember that you may probably keep well even though working if you give up all play. Practice physical conservation.

* * * * * * *

Do not spit on the sidewalk or in your handkerchief or into anything except a spit cup.

Burn all your sputum before it dries.

Never swallow what you cough up.

Do not let flies get at your spit cup.

Hold a handkerchief or a paper napkin before the mouth when coughing or sneezing, and wipe the lips with it.

Have a large pocket with removable lining to keep soiled paper napkins in, or carry a paper bag for the purpose; burn them every night.

Wash face and hands several times daily and keep finger nails clean.

Do not allow your clothing or bedclothes to become soiled with sputum.

Have your own towel, soap, and drinking glass.

Scald your dishes, and wash them separately.

Boil your handerchiefs before adding them to the wash.

Sleep alone.

Wear neither beard nor mustache.

Carefully cleanse the teeth twice daily.

Never kiss anyone.

ADVICE TO THE WELL

Keep in good physical condition all the time. Avoid excessive fatigue, but if a desk worker get some exercise every day.

Cultivate a proper carriage of the body.

Breathe through the nose and practice deep breathing in the open air several times every day.

Bathe frequently; a cold sponge bath every morning will help ward off colds. Avoid hot rooms.

Sleep with windows open; spend several hours outdoors every day; and keep the room well aired where you live, work, or study.

Promptly treat any sickness; do not try to work it off.

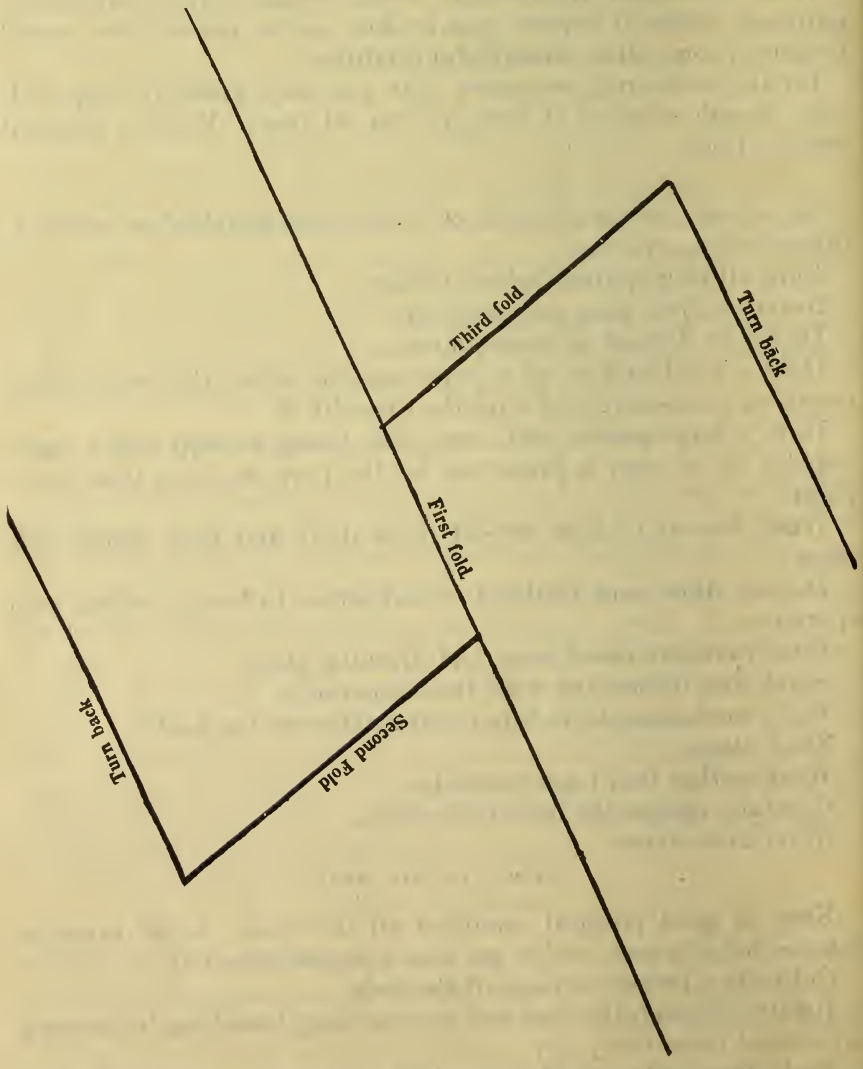
Sleep nine hours every night, eat regularly and slowly, and be temperate in all things.

Do not move into a house vacated by a consumptive until it has been well cleaned and disinfected, or repainted and repapered.

Do not work in a shop or office which is dusty or poorly ventilated.

Never use a common drinking cup at a public fountain.

MAKE YOUR OWN DRINKING CUP—IT'S THE SANITARY WAY.



A PIECE OF CLEAN PAPER 8 INCHES SQUARE IS ALL YOU NEED.
A SIMPLE MATTER TO FOLD.

Report the promiscuous spitter.

Have your lungs examined once a year.

Regard any cough lasting more than three weeks with suspicion.

Buy a clinical thermometer and when in doubt watch your afternoon temperature. A daily rise of more than half a degree, except after exercise, is suspicious.

Remember that tuberculosis is the most common of all serious diseases and that it may simulate the common cold, asthma, malaria, rheumatism, neurasthenia, dyspepsia, and a host of other ailments.

When your doctor is in doubt about the diagnosis, retrench, economize on physical expenditures for a month or two, give up all exercise, retire at 6 p. m., stay in bed all day Sundays and holidays, remove to a cooler, larger, better ventilated room or house, take extra nourishment, and shorten your hours of work if possible.

Practice no fads. If possible, rest when tired, sleep when sleepy, and eat three good meals daily in which butter and other fats, fresh meat, eggs, or other proteids, vegetables, bread, sugar, and other carbohydrates are all represented.

Give your child absolute protection. Do not allow him to live in the same house nor visit the room of a consumptive, nor be kissed or handled by the sick or by those of unknown health.

Do not allow him to place in his mouth anything taken from the mouth of another person, such as a whistle, horn, candy, or partly-eaten fruit.

Protect him to the uttermost until late childhood from measles and whooping cough.

See that he sleeps 10 hours every night and as late each morning as he wishes.

Insist upon his eating sufficiently of plain, wholesome food.

Use certified or pasteurized milk. A tuberculous mother should never nurse her baby.

Provide an outdoor playground.

Oppose child labor, both in factory and at home.

Care for the teeth, have adenoids removed, and cooperate with the school physician.

REGULATIONS TO PREVENT THE SPREAD OF TUBERCULOSIS IN GOVERNMENT BUILDINGS, OFFICES, AND WORKSHOPS [1]

1. All persons in Government employ are positively forbidden to spit upon the floors.

2. Rooms, hallways, corridors, and lavatories shall be freely aired and effectually cleaned at least once a day and not during working hours.

3. Spittons shall receive a daily cleansing with very hot water and when placed ready for use must contain a small quantity of water.

[1] Prepared by the Committee on Prevention of Tuberculosis in Government Buildings in accordance with Executive Order of December 7, 1905.

4. Dust must be removed as completely as possible by means of dampened cloths or mops. It should never be needlessly stirred up by a broom or duster, as this practice only spreads the dust and germs.

5. Floors of tiling, brick, or stone must be frequently scoured with soap and water.

6. The senior clerks in charge of workrooms will take measures to secure during working hours the admission of as much fresh air and sunshine as the condition will permit.

7. The use of individual drinking glasses is recommended.

8. Persons in Government employ who suffer from pulmonary tuberculosis shall when possible be separated from others while at work.

9. Such persons will not be permitted to use the public spittoons, but must provide themselves with individual sputum receivers, preferably of easily destructible material, and carry these with them on arrival and on departure. They will be held strictly responsible for the disposal and destruction of their own sputum, so that no other person's health may be endangered therefrom.

10. Such persons must provide their own drinking glasses, soap, and towels, and shall not use those provided for the general use.

11. Plainly printed notices, reading as follows: "DO NOT SPIT ON THE FLOOR; TO DO SO MAY SPREAD DISEASE," shall be prominently posted in rooms, hallways, corridors, and lavatories of public buildings.

PUBLICATIONS ON TUBERCULOSIS

Following is a list of some publications bearing upon tuberculosis issued by the United States Public Health Service. Many of the bulletins and reprints here listed may be obtained without charge by applying to the United States Public Health Service, Washington, D. C.; those publications marked "Exhausted," however, may be obtained only from the Superintendent of Documents, Washington, D. C., at the price specified.

HYGENIC LABORATORY BULLETINS

57. I. The Presence of Tubercle Bacilli in the Circulating Blood in Clinical and Experimental Tuberculosis. By John F. Anderson. II. The Viability of the Tubercle Bacillus. By M. J. Rosenau. September, 1909. **Exhausted. 5 cents.**

99. The Friedmann Treatment for Tuberculosis: A report of the board appointed for its investigation. By John F. Anderson and Arthur M. Stimson. October, 1914. **Exhausted. 10 cents.**

101. I. Complement Fixation in Tuberculosis. By A. M. Stimson. (Other papers in this bulletin not on tuberculosis.)

132. Small pneumothorax in tuberculosis. By Nathan Barlow and James C. Thompson. September, 1922.

PUBLIC HEALTH BULLETINS

35. The Relation of Climate to the Treatment of Pulmonary Tuberculosis. By F. C. Smith. Revised Edition. October, 1916.

53. Studies of Plague and Tuberculosis Among Rodents in California. VI. A note on the susceptibility of ground squirrels (*Citellus Beechyi*, Richardson) to tuberculosis. By George W. McCoy and Charles W. Chapin. January, 1912. **Exhausted. 5 cents.**

58. Open-Air Schools for the Cure and Prevention of Tuberculosis among Children. By B. S. Warren. October, 1912.

60. Rules to be Observed by Tuberculous Patients. By F. C. Smith. January, 1913. **Exhausted. 5 cents.**
73. Tuberculosis Among Industrial Workers: Report of an investigation made in Cincinnati, with special reference to predisposing causes. By D. E. Robinson and J. G. Wilson. March, 1916. **Exhausted. 25 cents.**
85. I. Miners' consumption. A study of 433 cases of the disease among zinc miners in southwestern Missouri. By A. J. Lanza. II. Roentgen ray findings in miners' consumption. By Samuel B. Childs. 1917. **Exhausted. 10 cents.**
138. Tuberculosis survey of the Island of Porto Rico. By J. G. Townsend. 1923.

REPRINTS FROM THE PUBLIC HEALTH REPORTS

125. The Friedmann Treatment for Tuberculosis: A report on the present status of its investigation by a board of officers of the Public Health Service. May 16, 1913.
158. Tuberculosis in Switzerland: Results of the campaign against the disease. By W. C. Rucker and R. A. Kearny. December 28, 1913.
221. Tuberculosis: The financial aspect of the sick leaving home in search of a beneficial climate. By Thompson Frazier. September 18, 1914.
249. The Spread of Tuberculosis: Report on the spread of infection in certain tuberculous families in five counties in Minnesota. H. G. Lampson. January 8, 1915.
265. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with special reference to the States of North Carolina and South Carolina. By A. D. Foster. March 12, 1915.
266. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with reference to the State of California. By P. M. Carrington. March 19, 1915.
269. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with special reference to the States of Texas and New Mexico. By Ernest A. Sweet. April 9, 16, and 23, 1915.
282. Tuberculosis: The municipal care and supervision of the tuberculous. June 18, 1915.
283. Interstate Migration of Tuberculous Persons: Its bearing on the public health, with special reference to the States of Arizona and Colorado. By A. J. Lanza. June 18, 1915.
309. Tuberculosis, with special reference to its epidemiology, transmissibility, and prevention. By George M. Kober. October 29, 1915. **Exhausted. 5 cents.**
356. The Sanitation of Railway Cars. By Thomas R. Crowder. August 11, 1916. **Exhausted. 5 cents.**
387. Climate and Tuberculosis: The relation of climate to recovery. By John W. Trask. February 23, 1917.
530. The dust hazard in the abrasive industry. Incidence of tuberculosis. By C.-E. A. Winslow, Leonard Greenburg, and David Greenberg. May 30, 1919.
640. The incidence of tuberculosis among polishers and grinders in an ax factory. By W. Herbert Drury. February 4, 1921.
663. Note on the course of pulmonary tuberculosis mortality since 1914. May 27, 1921.
667. Notes on tuberculosis sanatorium planning. June 17, 1921.
668. The surgical treatment of tuberculosis. By R. W. Hart. June 17, 1921. **Exhausted. 5 cents.**

712. The medical profession and the tuberculous ex-service patient. By C. M. Montgomery. December 2, 1921. **Exhausted. 5 cents.**
784. Tuberculosis among the ex-service men. By Hugh S. Cumming. September 15, 1922. **Exhausted. 5 cents.**
799. Mortality from pulmonary tuberculosis in recent years. I. The variation in its course during the war and its decline since 1918. By Rollo H. Britten and Edgar Sydenstricker. November 17, 1922.
824. A report on the indigent migratory consumptive in certain cities of the Southwest. By Jessamine S. Whitney. March 23, 1923. **Exhausted. 10 cents.**
829. Tuberculosis: Its predisposing causes. By F. C. Smith. April 13, 1923.
841. An index to State tuberculosis laws. Compiled by James A. Tobey. June 1, 1923.

SUPPLEMENTS TO THE PUBLIC HEALTH REPORTS

26. Public Health Administration in Richmond, Ind. A report of a survey to determine the incidence of tuberculosis. By J. C. Perry. October 8, 1915.

MISCELLANEOUS PUBLICATIONS

27. Tuberculosis: Its Nature and Prevention. By F. C. Smith. Revised, 1924. (Formerly Public Health Bulletin No. 36.)
28. Getting well. Some things worth knowing about tuberculosis. 1921.

RELATED PUBLICATIONS

As the prevention of tuberculosis depends very much on personal hygiene, a number of more general publications are given herewith. If available, these may be obtained without charge by applying to the United States Public Health Service, Washington, D. C.

PUBLIC HEALTH BULLETINS

69. Typhoid Fever: Its Causation and Prevention. By L. L. Lumsden. May, 1915.
76. Health Insurance: Its Relation to the Public Health. By B. S. Warren and Edgar Sydenstricker. March, 1916.
78. Influence of Occupation on Health During Adolescence. Report of a physical examination of 679 female minors under 18 in the cotton industries of Massachusetts. **Exhausted. 10 cents.**
81. Studies in vocational diseases. The effect of gas-heated appliances upon the air of workshops. By Charles Weisman. 1917.
129. Communicable diseases and travel. By Thomas R. Crowder. 1922.
134. The campaign against malnutrition. 1923.

REPRINTS FROM PUBLIC HEALTH REPORTS.

100. Whooping Cough—Its Nature and Prevention: A popular discussion of a widespread and dangerous disease for which familiarity has bred contempt. By W. C. Rucker. October 25, 1912. (Revised, 1922.)
150. The Citizen and the Public Health: The individual's relation to the health of the community. By John W. Trask. November 7, 1913.
197. Industrial Insurance: Medical examination of employees and prevention of sickness its proper foundation. By J. W. Schereschewsky. June 5, 1914.
234. Physical Examination of Workers. By J. W. Schereschewsky. November 20, 1914.

250. Sickness Insurance: Its relation to public health and the common welfare. By B. S. Warren. January 8, 1915.
287. The Practical Use of Disinfectants. By H. E. Hasseltine. July 2, 1915. **Exhausted. 5 cents.**
306. Lung Capacity of Children: Spirometer tests of 1,618 white school children (751 boys; 867 girls) in the city of X. By C. W. Stiles and Floyd Graves. October 15, 1915. **Exhausted. 5 cents.**
436. The control of communicable diseases. Report of the American Public Health Association Committee on Standard Regulations. October 12, 1917.
460. Health hazards from the use of the air hammer in cutting Indiana limestone. By J. P. Leake. 1918.
585. Efficiency of devices to protect sand blasters. By C.-E. A. Winslow, L. Greenburg, and E. H. Reeves. 1920.
616. A study of the dust hazard in the wet and dry grinding shops of an ax factory. By C.-E. A. Winslow and L. Greenburg, 1920.
632. Diseases prevalent among steel workers in a Pennsylvania city. By Dean K. Brundage. 1920.
638. Modern medicine and the public health. By W. T. Sedgwick. 1921. **Exhausted. 5 cents.**
670. Inhalation experiments on influenza and pneumonia and on the importance of spray-borne bacteria in respiratory infections. By W. B. Wherry and C. T. Butterfield. 1921.
727. The Care of Your Baby. February 3, 1922.
729. Efficiency of various systems of air-conditioning in a munitions factory. By C.-E. A. Winslow. 1922.
773. Efficiency of various kinds of ventilating ducts. By C.-E. A. Winslow and Leonard Greenburg. 1922.
778. Diphtheria: Its prevention and control. By J. W. Schereschewsky and R. E. Dyer. 1922.
780. Measles. By W. C. Rucker. 1922.

SUPPLEMENTS TO THE PUBLIC HEALTH REPORTS.

2. Indoor Tropics: The injurious effect of overheated dwellings, schools, etc. By J. M. Eager. January 31, 1913. **Exhausted. 5 cents.**
5. Fighting Trim: The importance of right living. By J. M. Eager. March 14, 1913. **Exhausted. 5 cents.**
36. What to do to become physically fit. 1918.

○

3m
27, 1937

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 27

TUBERCULOSIS

ITS NATURE AND PREVENTION

By

F. C. SMITH
Medical Director, U. S. Public Health Service

Prepared by direction of the Surgeon General

[REVISED 1937]

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1937

ADDITIONAL COPIES

OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT

5 CENTS PER COPY

614.09
Un3m
no.27
1937

TUBERCULOSIS: ITS NATURE AND PREVENTION[1]

By F. C. Smith, *Medical Director, United States Public Health Service*

"It is in the power of man to cause all parasitic (germ) diseases to disappear from the world."—Pasteur

The campaign against tuberculosis is showing results. The death rate from tuberculosis has been greatly reduced in the last 30 years. Improved living conditions have helped to reduce this disease. Better houses for the working man and woman, better care of young children, less work for growing children, better food for all classes of people, have been helpful. Tuberculosis is still, however, one of the most important diseases we have to combat, causing 70,000 to 80,000 deaths each year in the United States.

Tuberculosis is most common in persons between the ages of 20 and 50, at which time people are most free from other diseases. This, moreover, is the money-earning period of life, and the sickness due to tuberculosis is an important cause of poverty. Tuberculosis is preventable, but it can not be suppressed by health authorities like scarlet fever or smallpox, because it is too common and too chronic. Each family must be taught how to meet the danger, and each person must learn how to protect himself against infection. If everyone—men, women, and children—will learn the important facts about tuberculosis and the means for its prevention, the next few years will witness a continued decrease in the disease, and the coming generation may see its way clear to complete freedom from it.

TUBERCULOSIS OF THE LUNGS (CONSUMPTION, PHTHISIS, PULMONARY TUBERCULOSIS) ONE OF THE CHIEF CAUSES OF DEATH

While tuberculosis is most common in young adult life, it may occur at any age. When babies have it, the intestines or membranes of the brain are parts frequently attacked, and death follows from peritonitis or tuberculous meningitis. Tuberculosis of the bones is common in children, and disease of the knee or hip joint or spine is usually tuberculous. It may attack any part of the body, and there is a form in which it occurs in many organs simultaneously, the patient

[1] Revision (1937) of the original article prepared by the same author in 1926.

17206°—37

dying of general tuberculosis. But the form in which the disease most commonly occurs at all ages is tuberculosis of the lungs; about nine-tenths of all the deaths from tuberculosis are due to this variety.

IT IS TRANSMITTED FROM THE SICK TO THE WELL

Tuberculosis is a contagious disease. Every existing case contracted it by breathing in or swallowing the germs which cause it. It is probably never inherited. Children of consumptive patients often become tuberculous because they have lived in an infected house and have inhaled and swallowed the germs repeatedly. It is not intensely contagious, like measles and scarlet fever; it is not contracted by merely coming in contact with a consumptive, nor even by living in the house with him, if he is careful and clean. It requires an intimate exposure to the disease, such as occurs when one sleeps with a consumptive, uses the same drinking cup, dishes, or towel, or shares a living room day after day with a careless patient, who spits on the floor or coughs with uncovered mouth. Its contagiousness is certainly less than that of typhoid fever, but tuberculosis furnishes its danger of infection for a much longer period—years instead of days. No one is so healthy or so strong that he may not at some time develop tuberculosis, although robust health is a most valuable safeguard. Probably all adults are able to withstand a few of the germs from time to time without becoming sick, but at certain times when the system is weakened by fatigue, privation, or intemperance, or by other diseases, such as measles, grippe, or pneumonia, tuberculosis may develop. Constant attention to the details of prevention is necessary if children live with a consumptive. Even an occasional exposure to the infection has some danger to children and it is needful to protect cars, boats, waiting rooms, restaurants, and all public places from infection by careless patients.

NATURE OF THE CONTAGION—THE TUBERCLE BACILLUS OR CONSUMPTION GERM

The germ is called the tubercle bacillus because small rounded bodies (tubercles) occurring in the diseased tissue are characteristic of the disease. The bacillus is very small and can be seen only with a high-power microscope and the aid of coloring matters, but under certain conditions, when established in some organ of the body, usually the lungs, it multiplies and is produced in enormous numbers. Tubercle bacilli are given off in the sputum (phlegm, expectoration, spit) and it is estimated that the daily sputum of the ordinary consumptive contains many millions of these germs. Every tiny speck of his sputum abounds with them and, of course, they are frequently present in his mouth and ordinary saliva. He leaves them

on the spoon with which he eats, on the edge of his teacup or glass, and on the mouthpiece of his pipe. If he wets his finger with the tongue in turning the pages of a book he may leave tubercle bacilli on the printed sheets. If he wipes his lips with his fingers, or in coughing covers his mouth with the bare hand, then whatever he touches—food, door knobs, another person's hand, a baby's toy—may become smeared with tubercle bacilli which find their way to the lips of some other person. If he coughs with uncovered mouth he sprays forth a multitude of fine droplets, which contain tubercle bacilli in such a fine suspension of moisture that they may float in the air and be inhaled directly into the lungs by some one near him. If sputum dries upon his handkerchief or bedding anyone handling them may inhale the infected dust, which will also arise from carpet or floor which he has soiled. Flies carry his sputum on their feet from the gutter to fruit on near-by stands or to food upon the table. People carry his sputum on their shoes from the pavement into rooms where babies crawl. And whether inhaled in dust or swallowed with food, tubercle bacilli may cause tuberculosis of the lungs. It is doubtful which mode of entrance is the more dangerous.

BOVINE TUBERCULOSIS

Cattle are subject to this disease, and milk from infected cows often contains the bacilli. This variety of the germ seldom or never causes tuberculosis of the lungs in man, but does cause disease of the bones, joints, and glands. About 8 per cent of all deaths from tuberculosis are due to the bovine bacillus, most of the victims being children.

The obvious remedy is to use only certified milk from tuberculin-tested herds, or to boil or pasteurize suspected milk. Pasteurized milk can be purchased in most cities. Its nutritive properties are not injured by the process and not only tubercle bacilli but other germs which may be present are killed.

FEAR OF THE DISEASE SHOULD BE BALANCED BY A PROPER KNOWLEDGE

At present some few people do not know that the disease is contagious and disregard precautions, but far more people, having learned this fundamental fact, are merely filled with helpless terror and disgust, lacking knowledge to be helpful to others or adequately to protect themselves. We must make up our minds that we can not get away from the consumptive. There are more than a million of them now living in the United States, and it is our duty to teach or force them into proper habits and at the same time protect our children and ourselves from the most common sources of infection. This can be done. The antispitting laws now existing in most cities

should be backed up by a strong public sentiment. The viciously careless consumptive who daily exposes his family or neighbors to disease should be put under proper institutional control. We may hope soon to see laws enacted prohibiting the housing of young children with consumptives and requiring that one or the other shall be removed. The exclusion of persons having open tuberculosis from the vocations of dairymen, cooks, waiters, nursemaids, and teachers is also rational.

But the casual exposure can not be avoided, nor is it very dangerous to adults. Instead of devoting all our efforts toward escaping exposure, therefore, we should also endeavor to increase the resistance of our bodies so that infection from without will be harmless and latent infection kept innocuous.

TIME OF INFECTION

Some physicians believe that infection usually occurs in childhood. If a large number of bacilli are received at once or if the exposure is prolonged or the child very young, death may occur in a short time from general tuberculosis. The younger the child and the more intimate the contact and the more prolonged the exposure, the greater is this danger. About 10 per cent of all deaths among children under 15 are due to tuberculosis.

But the relation of early infection to tuberculosis in later life is also important. It is known that many people are infected before the age of 16. If a drop of tuberculin is rubbed into a slight abrasion in the skin of a person who has ever been infected with tubercle bacilli, slight redness and swelling appear within a day or two and persist for a short time. This test (the Von Pirquet tuberculin test) shows that infection is very common among healthy adults. It is known that tubercle bacilli may be present, alive but dormant, in a healthy person's lymphatic glands for many years. This constitutes a latent infection which becomes active and dangerous only when that person is overworked or underfed or housed in a debilitating atmosphere or when from dissipation, excessive amusements, or worry he suffers from physical or mental overstrain. This smoldering fire is apt to burst into flame after the system is exhausted by certain diseases, especially measles, whooping cough, influenza, pneumonia, typhoid fever, and diabetes. In such cases the bacilli are allowed to escape and infection is spread, usually to a lung, which is the most susceptible organ.

To the latent infection contracted in childhood many scientists attribute most adult tuberculosis. Others believe that adults, whether harboring latent infection or not, may be infected from without, and that reinfection is a common cause of adult tuberculosis.

It happens that tuberculosis is most common during those ages when men and women are putting forth their greatest physical and mental efforts. Between the ages of 20 and 40 about one-third of all deaths are due to it. It is most frequent among the poor because they can not avoid fatigue, nor nurse minor ailments, nor escape other diseases which predispose to infection, nor can they house or feed themselves in a manner to enhance resistance. The struggling student, the religious recluse, the roué and the rounder, the dissolute spendthrift, the miser, the ascetic, the chronically tired business man and the overamused society girl, as well as the poor, are predisposed to tuberculosis through unwise or unworthy exhaustion of physical resources.

TUBERCULOSIS IS A SLOW DISEASE—ONE DOES NOT DIE QUICKLY NOR RECOVER QUICKLY FROM IT

Besides having an indefinite incubation period, the disease is usually slow in progress. A man may be able to continue his work for a year, or for many years, after he first becomes sick. One with early tuberculosis seldom feels very sick, does not look ill to his friends, and will follow his usual pursuits. He may even, under favorable circumstances, get well without ever knowing that he had tuberculosis. Very often a skillful physician after patient and careful examination makes the diagnosis of early tuberculosis; the patient after a few months presents himself to another doctor who is unable to find signs of the disease. There is nothing strange in this, for early cases are often cured by a few months' rest. It is more frequently cured than most people think and more common than was formerly believed, because only those cases which progressed to an advanced stage were called tuberculosis until a few years ago.

EARLY SYMPTOMS OF THE DISEASE NOT ALARMING

While the symptoms of advanced tuberculosis can be recognized by almost anyone, early symptoms are not typical. Cough is not always present; sometimes a slight afternoon fever is the only symptom for months, and the patient may think he has malaria. A loss of weight and strength, rapid heartbeat, a sense of fatigue on slight exertion, loss of appetite or indigestion, with perhaps slight pains in the chest and hoarseness or cough, are the commonest symptoms of early tuberculosis. Bloody sputum, chills, night sweats, emaciation, the hectic flush, copious expectoration, and inability to work are usually late symptoms. Tubercle bacilli may be present very early or they may not be found until late in the disease. To make an early diagnosis a skillful physician will sometimes need several weeks of close ob-

servation. The family physician can best do this, with perhaps one examination by some specialist whom the family doctor calls. Never consult a doctor who advertises in the papers or in any other way. A doctor who advertises is probably a quack who cares only for money, and in tuberculosis the patient has special need to rely on the honesty of his physician. For the poor in cities there are numerous dispensaries where they can be examined free of charge by the best medical talent.

EARLY DIAGNOSIS OF THE DISEASE VERY IMPORTANT

The importance of an early diagnosis is twofold. In the first place, proper treatment at this time will usually effect a cure, and, in the second place, the early cases are often dangerous carriers of infection. A very slight cough may be bringing up thousands of the bacilli daily. A dry cough or a sneeze may spray hundreds of infected droplets of moisture from the mouth or nose while the patient may be unaware that he is carrying infection.

There is only one way to insure early diagnosis in all cases, and that is by frequent periodical physical examination. If opportunity were afforded, expert examiners could often diagnosis tuberculosis several years before it is now commonly found, and early enough so that recovery could frequently be effected without recourse to sanatorium treatment and without protracted disability. Better still, development of the disease could often be forestalled by timely correction of unwise habits of living. There is no other reliable method of detecting early tuberculosis. A "snap" diagnosis is frequently wrong, since the flat chested and anemic are often not tuberculous, and those of robust appearance sometimes are. The X ray is often necessary, and tuberculin tests are useful in the adult, but of more importance in children under 2 years. The early diagnosis of pulmonary tuberculosis is assured only when a skillful physician has periodical opportunity to examine the bared chest in a warm, quiet room, to ascertain the daily temperature for a week or more, and to acquaint himself with the personal history of the case.

The fear of pain and a high regard for personal appearance cause most intelligent people frequently to seek a dentist for examination and correction of incipient dental troubles. A similar regard for one's general good health would prompt a complete examination of the body at least once a year. The physical examination of school children, now compulsory in some cities, is an excellent beginning. Some industrial concerns make periodical physical examination of their employees, well knowing that the principle of frequent inspection and timely repair is quite as applicable to the human machine as to their less valuable but better cared for engines of brass and steel.

TUBERCLE BACILLI WILL LIVE SEVERAL WEEKS IN SPUTUM OR IN DUST, ESPECIALLY IN DARK PLACES

The tubercle bacillus when cast out in the sputum is not destroyed by rain or snow or by the lowest winter temperatures. In a dark room or hall it lives for months, but sunlight kills it in a few hours, and good, strong daylight in a well-lighted, clean room will destroy it in a few days. Dirt serves as an envelope to protect the bacillus from light, and so preserves it. Dust is a vehicle to convey the germs through the air, and rooms should never be swept dry, nor should a "duster" of feathers or cloth ever be used. A consumptive's floor should be without carpets, and is best cleaned by scrubbing with soap and water. A boiling temperature kills the bacillus in a few minutes, and boiling in water is one of the best ways to disinfect dishes, bedding, handkerchiefs, clothing, napkins, and towels which the patient has used. Carpets, rugs, and clothing, which would be injured by boiling, should be fumigated by sprinkling the articles well with formalin and then wrapping them up as nearly air-tight as possible in paper or inclosing them in a tight chest or small closet. They should be thus kept confined in the fumes of the formalin for 24 hours and then thoroughly aired.

ANTISEPTICS OR DISINFECTANTS SPRINKLED ABOUT THE ROOM ARE USELESS

Antiseptics are of little practical use around the house. The practice of putting chloride of lime, formalin, carbolic acid, sulphur, or any other antiseptic into sinks or in basins placed in the sick room is useless. Germs, living in the air, in the dust on walls and carpets, or in the dirt in corners, are in no way affected by antiseptics placed in these basins. Moreover, no antiseptic solution sprinkled or mopped on floors, walls, or furniture is of any use unless all surfaces are kept soaked with it for several hours, and not then unless the dirt has been previously removed to allow the fluid access to the objects. Soap and water for floors and a wet cloth with which to wipe furniture are the best agents to combat infection. A vast amount of money is spent on much-advertised but worthless antiseptics. There is no antiseptic which has any practical value in the daily cleaning of a house. If the patient uses a spittoon or unburnable cup, however, 5 per cent carbolic acid or strong lye water should be placed in the container before it is given to the patient, and left there all day while he uses the article. There should be enough of it to equal the amount of sputum to be disinfected.

WATERPROOF PAPER CUPS, WHICH CAN BE BURNED, ARE THE BEST SPUTUM RECEIVERS

By far the best way to dispose of sputum is to receive it into waterproof paper cups and then to burn cup and contents together in the

fire. These cups are cheap, and can be bought in any size at most drug stores; small ones can be carried in the pocket or large ones placed near the bed. Paper handkerchiefs are best to hold in front of the mouth when coughing and to wipe the lips, after which they must be burned with the sputum cup. The immediate destruction of all sputum from consumptives is the most important thing in the fight against tuberculosis, and the promiscuous spitter should be regarded with suspicion and disapproval and punished promptly and severely. Tubercle bacilli are often present in sputum during the early stages of the disease when one feels perfectly well; and even though repeated examinations of sputum have failed to reveal them, it is never safe to presume on this evidence in a case suspected of being tuberculosis, as the bacilli may be absent one day and present the next. The habitual use of a spit cup by every spitter should be compulsory. For use on the street there are several forms of pocket cups, some of which can be concealed in a handkerchief and used without being seen. But we need to cultivate everywhere a sentiment in favor of the spit cup. The person who carries one deserves respect and approval; it shows a good citizen, a law abider, and one of clean habits.

TUBERCULOSIS IS ALWAYS A SERIOUS DISEASE IN ANY STAGE

Tuberculosis is curable, but is a very serious disease no matter how slight the symptoms may be. Sometimes it is difficult to convince patients of this, as they often feel well and do not look sick; but when tuberculosis is diagnosed the subject should put himself unreservedly into the hands of his doctor. In no other serious disease is a sense of well-being so common or so deceptive, and until the disease has been under observation for perhaps a year it is never possible to tell how much lung tissue will be damaged or what the outcome will be.

TREATMENT: REST—AIR—FOOD

Rest, pure air, and good food are the three essentials in treatment. Patients are no longer told to go West and rough it, because rest and good food are fully as necessary as fresh air. Rest in the open air is the ideal condition for recovery. A hammock out of doors, a bed on a porch, a mattress on the fire escape, or a pallet on a roof afford this condition. Rest means not only freedom from work, manual and mental, but the giving up of sports. A consumptive in any stage of the disease should not walk, ride, row, play ball, tennis, golf, pool, billiards, or cards, except as permitted by a physician. The laboring man or woman with a family to support is at a disadvantage, but sometimes a little rest will throw the balance in his favor in a fight against the disease. Strict temperance, bed as many

hours as possible out of the 24 and complete rest all day Sunday, with conditions favorable for open-air sleeping, will sometimes enable an early case to effect a cure while working, but all work should certainly be given up if there is any possibility of honorably avoiding it.

PATENT MEDICINES USELESS AND DANGEROUS

There is no drug known, however rare or expensive it may be, that has any special curative action on this disease, and all remedies advertised as such are to be avoided. Patent cough medicines are harmful; radium, X rays, or electricity in any of its forms have no special value in tuberculosis of the lungs. No serum has yet been found that will cure it, and there is no plaster or poultice which has any effect on the disease itself. There are many symptoms peculiar to each case which may require medicines, but what is good for one patient may be very bad for another, and a doctor should be in charge to prescribe all medicines taken and to regulate the patient's daily life.

HOSPITALS EXCELLENT FOR TREATING ADVANCED CASES

If it becomes evident that the disease is progressing, then the consumptive should seek a hospital in his own city or town. A few weeks in bed from time to time when one is losing weight or having fever will often enable the patient to resume his work distinctly improved, and not only does a hospital offer the most favorable conditions for a cure but by entering an institution, danger of infecting members of the family is avoided. Few far advanced consumptives are capable of observing the necessary precautions around the house without considerable help. It is their duty to protect their relatives and friends from infection and at the same time to avail themselves of medical skill and superior accommodations found in a hospital which sometimes enable the most hopeless consumptive to arrest his disease.

There is no good reason why any hospital should not admit tuberculous patients to special wards or rooms for a temporary period. It is less difficult to prevent the infection of others from tuberculosis than from typhoid fever or septic conditions and many other diseases commonly found in general hospitals. It is desirable for general medical and surgical hospitals of all kinds to admit tuberculous patients, because these hospitals would then provide means for training internes and other local physicians in the diagnosis and treatment of tuberculosis. Such a custom would often enable a patient to be placed under treatment immediately in a local hospital instead of waiting for several months for a vacancy in some remote sanatorium. It would also tend to promote confidence

in the local climate and combat the too prevalent custom of sending patients away to some distant resort.

CHANGE OF CLIMATE RARELY NECESSARY

The reason why some climates are better than others for tuberculosis is that open-air sleeping and rest out of doors are more pleasant in some places on account of more agreeable temperature and greater frequency of sunshiny days. Cold weather in itself is not an objection; in fact, it is favorable in the treatment of tuberculosis. High altitude is of doubtful advantage and no longer urged for ordinary cases. Most consumptives, rich or poor, prefer to remain near home, and they can almost always do this safely. The money which would be spent to send the patient to a distant State can often be used to much better advantage in constructing a place for open-air sleeping, in buying woolen underwear or bed comforts, and in providing milk, eggs, and other nourishing food. Most States and many cities have sanatoria or hospitals where patients may be treated, sometimes free of charge, and be near enough to their homes to see their friends frequently. An early case properly cared for will usually arrest his disease in any climate, while for a far advanced case rest, food, and nursing, which are more apt to be found near home than among strangers, are more important than a choice location.

NIGHT AIR IS GOOD FOR CONSUMPTIVES

Sleeping out of doors or under conditions as nearly as possible like outdoors is very essential in the treatment of tuberculosis. No one need be afraid of night air; all outdoor air is good, whether it is sea or mountain air, city or country air, the air of pine woods, or that of the plains. In winter woolen bed slippers, heavy flannel night clothes, and perhaps a soft cap may be needed, but with a little experience one can sleep warm in the coldest weather even in northern States. If it is not possible to find a porch or balcony to sleep on, then a room with two or more windows, all of which must be wide open, should be selected. Not only at night but also by day the patient should live in the open air, either at rest, sitting or reclining, or taking light exercise as the doctor directs.

ADVICE TO THE SICK

Keep bedroom windows open constantly and stay in bed both day and night until your temperature remains normal at all hours.

Take no medicine except that prescribed by your doctor; spend your money for food rather than drugs.

Drink no whisky, beer, or other liquors unless prescribed by your doctor.

Eat regularly and try to get fat; a gain in weight is most favorable. Plain food is much better than dainties; milk and eggs are good. Vegetables and bread and butter must not be omitted.

Take no exercise except as ordered by your doctor.

Never run; avoid getting tired; a long walk which brings you home exhausted may spoil the gain a whole week of rest has made.

Keep your feet warm and dry.

If you are offered admission to a hospital accept at once.

Do not seek another climate except by advice of your physician and with full knowledge of the living conditions in the proposed location.

When sufficiently recovered to work, return to your former employment unless it exposes you to dust, undue physical or mental fatigue or some other unhealthful condition.

Having recovered, remember that you may probably keep well even though working if you give up all play. Practice physical conservation.

* * * * * * *

Do not spit on the sidewalk or in your handkerchief or into anything except a spit cup.

Burn all your sputum before it dries.

Never swallow what you cough up.

Do not let flies get at your spit cup.

Hold a handkerchief or a paper napkin before the mouth when coughing or sneezing, and wipe the lips with it.

Have a large pocket with removable lining to keep soiled paper napkins in, or carry a paper bag for the purpose; burn them every night.

Wash face and hands several times daily and keep finger nails clean.

Do not allow your clothing or bedclothes to become soiled with sputum.

Have your own towel, soap, and drinking glass.

Scald your dishes, and wash them separately.

Boil your handerchiefs before adding them to the wash.

Sleep alone.

Wear neither beard nor mustache.

Carefully cleanse the teeth twice daily.

Never kiss anyone.

ADVICE TO THE WELL

Keep in good physical condition all the time. Avoid excessive fatigue, but if a desk worker get some exercise every day.

Cultivate a proper carriage of the body.

Breathe through the nose and practice deep breathing in the open air several times every day.

Bathe frequently; a cold sponge bath every morning will help ward off colds. Avoid hot rooms.

Sleep with windows open; spend several hours outdoors every day; and keep the room well aired where you live, work, or study.

Promptly treat any sickness; do not try to work it off.

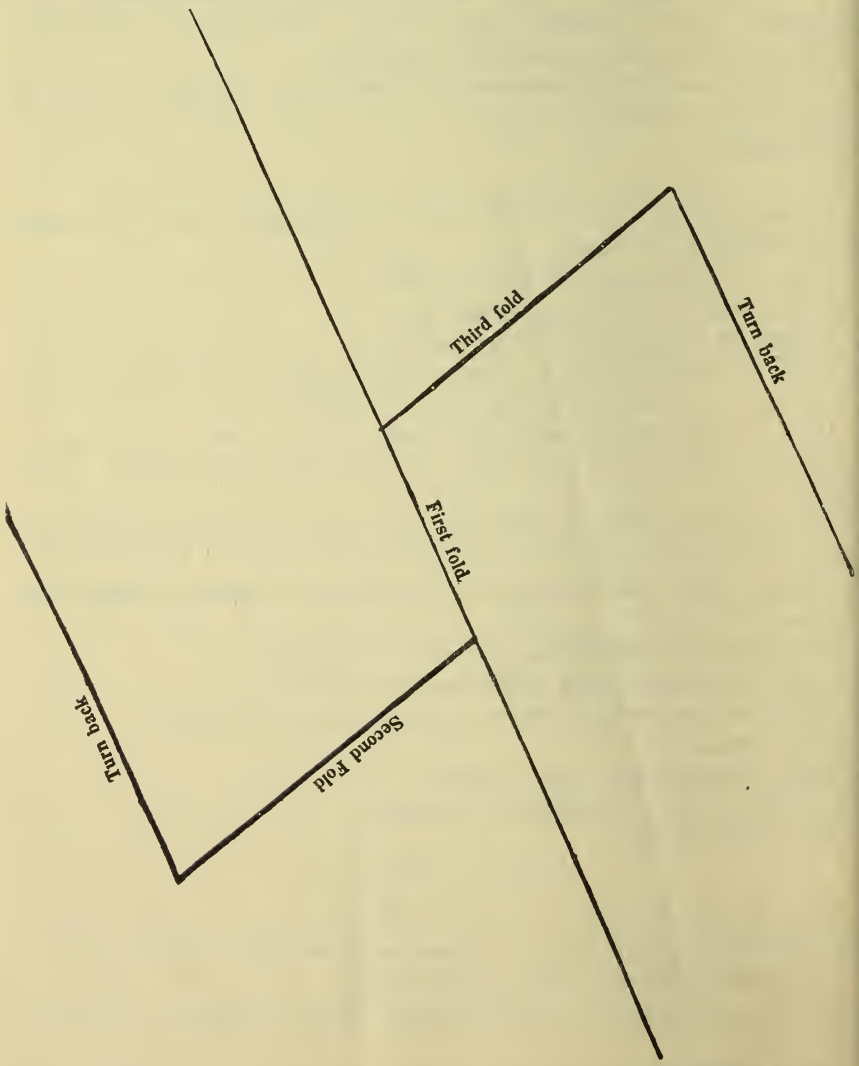
Sleep nine hours every night, eat regularly and slowly, and be temperate in all things.

Do not move into a house vacated by a consumptive until it has been well cleaned and disinfected, or repainted and repapered.

Do not work in a shop or office which is dusty or poorly ventilated.

Never use a common drinking cup at a public fountain.

MAKE YOUR OWN DRINKING CUP—IT'S THE SANITARY WAY.



A PIECE OF CLEAN PAPER 8 INCHES SQUARE IS ALL YOU NEED.
A SIMPLE MATTER TO FOLD.

Report the promiscuous spitter.

Have your lungs examined once a year.

Regard any cough lasting more than three weeks with suspicion.

Buy a clinical thermometer and when in doubt watch your afternoon temperature. A daily rise of more than half a degree, except after exercise, is suspicious.

Remember that tuberculosis is the most common of all serious diseases and that it may simulate the common cold, asthma, malaria, rheumatism, neurasthenia, dyspepsia, and a host of other ailments.

When your doctor is in doubt about the diagnosis, retrench, economize on physical expenditures for a month or two, give up all exercise, retire at 6 p. m., stay in bed all day Sundays and holidays, remove to a cooler, larger, better ventilated room or house, take extra nourishment, and shorten your hours of work if possible.

Practice no fads. If possible, rest when tired, sleep when sleepy, and eat three good meals daily in which butter and other fats, fresh meat, eggs, or other proteids, vegetables, bread, sugar, and other carbohydrates are all represented.

Give your child absolute protection. Do not allow him to live in the same house nor visit the room of a consumptive, nor be kissed or handled by the sick or by those of unknown health.

Do not allow him to place in his mouth anything taken from the mouth of another person, such as a whistle, horn, candy, or partly-eaten fruit.

Protect him to the uttermost until late childhood from measles and whooping cough.

See that he sleeps 10 hours every night and as late each morning as he wishes.

Insist upon his eating sufficiently of plain, wholesome food.

Use certified or pasteurized milk. A tuberculous mother should never nurse her baby.

Provide an outdoor playground.

Oppose child labor, both in factory and at home.

Care for the teeth, have adenoids removed, and cooperate with the school physician.

REGULATIONS TO PREVENT THE SPREAD OF TUBERCULOSIS IN GOVERNMENT BUILDINGS, OFFICES, AND WORKSHOPS [1]

1. All persons in Government employ are positively forbidden to spit upon the floors.

2. Rooms, hallways, corridors, and lavatories shall be freely aired and effectually cleaned at least once a day and not during working hours.

3. Spittoons shall receive a daily cleansing with very hot water and when placed ready for use must contain a small quantity of water.

[1] Prepared by the Committee on Prevention of Tuberculosis in Government Buildings in accordance with Executive Order of December 7, 1905.

4. Dust must be removed as completely as possible by means of dampened cloths or mops. It should never be needlessly stirred up by a broom or duster, as this practice only spreads the dust and germs.

5. Floors of tiling, brick, or stone must be frequently scoured with soap and water.

6. The senior clerks in charge of workrooms will take measures to secure during working hours the admission of as much fresh air and sunshine as the condition will permit.

7. The use of individual drinking glasses is recommended.

8. Persons in Government employ who suffer from pulmonary tuberculosis shall when possible be separated from others while at work.

9. Such persons will not be permitted to use the public spittoons, but must provide themselves with individual sputum receivers, preferably of easily destructible material, and carry these with them on arrival and on departure. They will be held strictly responsible for the disposal and destruction of their own sputum, so that no other person's health may be endangered therefrom.

10. Such persons must provide their own drinking glasses, soap, and towels, and shall not use those provided for the general use.

11. Plainly printed notices, reading as follows: "DO NOT SPIT ON THE FLOOR; TO DO SO MAY SPREAD DISEASE," shall be prominently posted in rooms, hallways, corridors, and lavatories of public buildings.

O

TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 28

GETTING WELL

SOME THINGS WORTH KNOWING ABOUT TUBERCULOSIS

Written Especially for the Use of Patients in Hospitals operated by The United States Public Health Service

PREPARED BY DIRECTION OF THE SURGEON GENERAL

By

MEDICAL OFFICERS OF THE SERVICE,
PRIVATE SPECIALISTS, AND PATIENTS

Edited and Arranged by
NATHAN BARLOW, Surgeon (R)

ADDITIONAL COPIES

OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT

5 CENTS PER COPY

WF
W3m
1909

GETTING WELL—SOME THINGS WORTH KNOWING ABOUT TUBERCULOSIS.

INTRODUCTION.

In this little book we have tried to make the treatment of tuberculosis easy to understand. There are some things about tuberculosis which can not be understood without a medical education. There are special points about every patient so that the treatment must be changed a little to suit his case. For instance, some patients do not become weak until the disease is far advanced. Such patients feel better than they really are; they do not look sick, and yet they will not get well unless they have a treatment which is suited to the real condition instead of being suited to what seems to be the condition. There are a great many other peculiar things about tuberculosis. Each case is different. Little things sometimes make the patient feel bad, and really serious changes may come about without his feeling them at all. Therefore a patient never should try to treat himself, but should always have the help and advice of a doctor who understands the treatment.

As you read this little book you will see that starting the treatment for tuberculosis is a great deal like starting on a long journey. You have to take the right train or the right boat in the first place. After you have started you can not jump off the train or off the boat whenever you feel like it and expect to get on again whenever you get ready. During the first part of the cure, "getting well" takes up all your time; later on you can do some other things, too. But you have to put the treatment first and the other things after. If your friends and relatives know something about the treatment they can help you a great deal and encourage you to stick to it until you are cured. If you would like to, you may ask the nurse for another copy of this book to send home. It may help the family to understand why you must stay in the hospital and what you need to do. Sometimes when a wife or sister writes a letter to a patient, she wants him to feel how much she misses him, and tells him all her troubles. She does this because she loves him, and she does not think about how it may worry him, and even make him want to go home to straighten things out. When there is real trouble at

home there are splendid organizations which will do all that they can to help the families of soldiers, sailors, and others who are sick in the hospitals. And anyway you will do better for your family if you stay in the hospital and get well than you will if you go home to straighten out some trouble and then fail to get well and die in a year or two.

There are several organizations headed by the American Red Cross which have workers in almost all of the hospitals who know from experience how to help the patients. Each of these does different things. One or the other of them will look up your lost brother, will buy shoes or neckties and keep changing them until you are suited, will take care of your mail, will write letters for you, and help you about your business affairs. If you have anything that should be attended to, ask the nurse to have workers from one of these organizations come to see you. If one of them can not help you out, the other can.

TREATMENT SHOULD BE PROMPT AND COMPLETE.

Tuberculosis often begins very slowly and gradually, and if there is only a little of it in the lungs and if this is deep in, it may be hard to be sure about it even with the X ray. In its very beginning tuberculosis gets better with just a little treatment or even with a rest from work, but it is not really cured in so short a time. In such patients an examination one week may show that there is a little disease, and after a week's rest it may be hard to find signs of anything of any importance. So if you have been weak or run down in health and have been told once or twice that there were signs of tuberculosis, and have been told at other times that there were no signs of any activity in your lungs, the best thing for you to do is to take treatment for a while. You can be sure that either you have a very slight tuberculosis or else that you are run down for some reason so that it is possible for tuberculosis to start spreading in your lungs. In either case the treatment for tuberculosis will do you a great deal of good, and by staying in one place and following the treatment you will make it possible for the doctors to study your case so thoroughly that there will be no doubt as to what your condition really is.

ACTIVITY.

Activity is not a medical word. When we say that tuberculosis is active we mean that it is doing something. If we are listening to the chest we mean that it is doing something we can hear. If we are looking at an X ray we mean that it is doing something that we can see. If we are working in the laboratory we mean that it is doing something to the sputum or the blood or whatever we are ex-

amining. If we are looking at the temperature chart we mean that it is causing fever. If we are looking at the history of the patient we mean that it is making him sick or weak or is doing something unpleasant to him. If we are talking about tubercles we mean that the germs are getting more numerous and the tubercles are getting bigger. So you see that activity sometimes means one thing and sometimes another. If you are told that your disease seems to be active do not be discouraged; it only means that you need more treatment. If you are told that there are no signs of activity, do not take it as meaning that the disease is entirely cured. While you are at rest in the hospital all signs of activity may go away, but the only real test of cure is the work test under the direction of the doctor. We will tell you about this later on in this book.

Chapter I.

SOME FACTS ABOUT TUBERCULOSIS.

Tuberculosis is a communicable disease; that is to say, it is what we call "catching," and like all diseases which can be caught it is caused by a tiny living germ. This germ is what the patients often jokingly call "the bug"; it is not a bug at all, but like all bacteria, belongs to the vegetable kingdom. It is called the tubercle bacillus. It is so small that we can not see it without a powerful microscope, but what it lacks in size it makes up in numbers; there are thousands of them in a single drop of the sputum which a patient coughs up after the disease is advanced.

Although tuberculosis is a "catching" disease, and although almost everybody gets a few of the germs at sometime or other in his life, yet it is not contagious in the same way that smallpox and scarlet fever are. A tuberculosis sanatorium is a perfectly safe place for grown people to go, and stay, if necessary.

"Consumption" is an old-fashioned word which was used for the late stage of tuberculsois when the patient was wasting away or being "consumed." Tuberculosis, nowadays, does not mean what "consumption" used to mean, because the doctors usually make the diagnosis much earlier when the hope of early cure is very much brighter. All "consumption" is tuberculosis, but all tuberculosis is not "consumption," If you are still in an early or moderately advanced stage make up your mind to get it cured now and do not wait until it becomes the old-fashioned "consumption." It is true that we understand the treatment better now, and that very many cases of "consumption" get well who would have died 20 years ago, but it is a longer and harder job to get well in the late stages than it is at first.

Tuberculosis is different from most other diseases in several ways; for one thing it does not cause so much pain or distress in the early stages. Even in the late stages there may be no pain worth mentioning unless there is some complication. For a long time the cough is so slight that it is not noticed; sometimes there is no cough at all. The patient may feel a little more tired at times or he may find that he takes cold a little more easily than he did before. For months this is sometimes the only sign noticed by the patient which would indicate that the disease is present. Even when the disease is more advanced, after a little treatment, a patient is likely to feel perfectly

well, so that he does not feel the need of keeping up strict treatment as he should do.

Another way in which tuberculosis is different from most other diseases is that the germ is covered by a wax coating which protects it from being destroyed by medicines, and interferes with the body itself in all its efforts to destroy it. The only way that the body can fight against tuberculosis is by building a wall around the place where the germs are located. It does this by growing a kind of tissue like that which it does after cuts and burns, which later turns into a scar. This scar is what is known as fibrous tissue or fibrosis. When the doctor speaks of fibrosis it means that there is being made now, or has been made in the past, scar tissue to wall off germs which are either there now or have been there. If the germs are shut in closely, they do not get what they need to live on, and some of them die, but sometimes a few of them live for many years, shut up in a wall which they can not get out of.

All the time that the body is trying to build this wall the germs are growing too, and all the while that they are growing they are making poisons which produce fever, rapid pulse, loss of weight, and the other symptoms of tuberculosis. In the lungs themselves these poisons produce inflammation. This inflammation causes the cough and sputum in early cases.

If there are enough of them these poisons do worse than cause inflammation; they destroy the wall which is being built up and permit the disease to extend still further until it breaks through into the bronchial tubes. The sputum then contains pus or "matter" and is likely to contain tubercle bacilli. Sputum with tubercle bacilli in it is called "positive sputum." Positive sputum always means that the patient has tuberculosis, and that somewhere in the lungs there is a place which broke down. Positive sputum is only found in about one-fifth of the very early cases, and even in later stages the sputum may be negative for months at a time. If the sputum has ever been positive, you ought to be very sure to take a treatment which is long enough. A place in the lungs which broke down once may break down again if it is not completely healed. Patients who have had positive sputum have been found to be more liable to relapse if they do not keep up treatment long enough. Pus or matter in sputum in which there are no tubercle bacilli does not always mean tuberculosis; it may be caused by other disease—for instance, bronchitis.

HOW TO GET WELL.

You can see that the cure of a disease like tuberculosis must be a long continued fight. Every bit of strength you have must go to building up the wall around the germs. The poisons of the disease prevent the proper digestion of food, and when there is only enough

nourishment in the body to fight the disease, there is none at all to be spent in amusement or work. Besides this, in the first part of the cure, poisons are poured out into the system from the places where the germs are growing. Every little thing you do, even a short walk or too much talking, makes the breathing a little faster and makes the heart beat a great deal faster. It may increase the amount of poisons and do harm. Sometimes after several weeks of rest the body may have just succeeded in stopping the progress of the germ. The patient may be feeling better and think that some little thing, such as an automobile ride or a trip to town, will not hurt him. Just this little thing is often enough to cause an extra amount of poison to be poured out, so that the wall which was being formed is partly broken down, and the patient in a very short time loses what he gained in days or weeks of treatment, and has to do it all over again. Each time that this is done the disease is a little further along and it is possible that a patient who might otherwise have been cured may remain under treatment for several years, be a reasonably good patient all of this time, and yet finally have even more disease than he had at the beginning, and all because every time he gained a little he threw it away under the mistaken idea that what he was going to do would not hurt him.

In the treatment of tuberculosis, then, we begin by saving every bit of strength the patient has and by keeping the pulse rate as slow as we can. We also do everything possible to build up the strength of the patient so as to help him in the fight against the progress of the disease. This is kept up until the temperature, pulse, and signs in the chest show that the progress of the disease has been stopped. Of course the only way that this can be done is to keep the patient at complete rest. This means that he does not get up to walk around at all; even walking around the ward may mean that the patient loses in the daytime all of the improvement that he made during the night. You can see for yourself that it is absolutely impossible to give the patient a pass and at the same time be really giving him a proper treatment for tuberculosis as long as the disease is progressive or active. This period of complete rest is different for each patient It is better that every active patient should begin his treatment with at least six weeks of complete rest. Advanced cases often require months or even a year or more of complete rest in bed and yet may finally become arrested cases. Complete rest may mean different things for different patients. Some patients may go to the bathroom and to the dining room without harm, others can not. Even if you have but very little disease, the most you can do and still take complete rest is to go to meals and to the bathroom. If you keep getting out of bed and sitting up, you may never get your treatment started right.

EXERCISE.

After the progress of the disease is checked, the wall which the patient has built around the germs is just strong enough to hold them while he is at complete rest, and his body is just able to take care of the amount of the poison which is formed while he is at complete rest. The next step in the treatment is to give him just enough exercise so that it will make it necessary for the body to build a little firmer wall and to become better able to take care of a little more poison, and yet not so much exercise that enough poison is poured out to tear down the wall or to weaken the strength of the body. Right here is where some of the fine points of treatment come in. The doctor has to think about everything to be able to tell just when the patient should exercise and how much to allow. What is too much for a very sick patient might not be enough for another. For some patients it is exercise if they simply sit up in bed for a half hour. Others begin with a walk across the room. Others begin with from 5 to 15 minutes of walking. You can see that if a patient has a great many large tubercles with thin walls, just a little exercise can cause a great deal of poison to come out of them. If he has a few small tubercles with firm walls around them, it takes much more exercise to bring out enough poisons to make any difference. The doctor also has to think about how strong the patient's heart is, and about all of his complications, and has to prescribe exercise just as he does medicine or any other treatment.

It is really true when we say that a patient with tuberculosis is taking medicine when he takes exercise. Exercise causes different substances to come out of the tubercles into the blood. Among these is tuberculin. You have heard of the tuberculin treatment. Tuberculin is injected into the patient, and is followed by what is called a "tuberculin reaction." Tuberculin is so strong a thing that an amount as big as a grain of wheat would be a dangerous dose for 600 tuberculous patients. The tuberculin treatment has been found to be dangerous unless it is given in just the right way. So you see that every time you take exercise you are giving yourself a dose of a very strong medicine. This medicine is not good for you at all in the beginning of your treatment. It takes more arsenic to poison you than it does tuberculin. Both arsenic and tuberculin are medicines, but you do not want overdoses of either one of them.

The doctor must determine in each case what is best for that particular patient, but in any case the amount is not increased the next day, nor the next. It is not increased until there has been time enough for the wall around the germs to be strengthened and for the body to become accustomed to the new conditions. The treatment is continued in this way; slight additions are made to the slight exercise

which the patient takes, each time waiting long enough for the wall around the germ and for the body itself to be hardened to the new amount of exercise. All this time the doctors and nurses are watching to be sure that there are no signs or symptoms showing that you are doing a little too much, which if continued might result in breaking down a part of the wall.

You can see that you do not want a pass until you are taking as much exercise at the hospital as you would on the pass. If you get the right start in the first part of your treatment, the last part will be very much easier. The best way is not to say, "Doctor, I want a pass to-morrow," but, "Doctor, do you think I could go down town to-morrow without its hurting me any? I do not want to go if you think it is too soon." It would be best not to ask him at all until you are so well that you have begun light exercise.

FOOD.

The patient with tuberculosis is almost always undernourished. To carry on his fight against the disease he needs the very best nourishment he can get. Some years ago it was considered good practice to force patients to take, in addition to regular meals, as many raw eggs and as much milk as they possibly could swallow. This sometimes resulted in a temporary gain of weight, but it was found that very few patients could continue such a treatment, and that many of them were left with their stomachs upset and weakened. Raw eggs are not digested any more easily than properly cooked ones are. On account of the poison of the disease, digestion is slower in tuberculous patients than in well people. Eating between meals destroys the appetite for the next meal, keeps the stomach working all the time, and results in the patient's taking less food in the long run than he does if he eats only at mealtime. It has been found by experience that tuberculous patients do better if they are given three well-balanced meals a day, with no lunches, excepting that in certain cases a glass of milk or a little lunch may be allowed at bedtime. The food should be nourishing and substantial; sweets, rich pastries, and frothy dainties should be avoided. Friends or relatives should not bring food, candies, pastries, etc., to the hospital, and the patient should not keep such things in his room. Experience has shown that it interferes with the hospital diet and in many cases brings on attacks of indigestion which sometimes keep the patient from improving as he should. Fruit is the least harmful, but the doctor should be consulted.

FRESH AIR.

Outdoor air is purer than that indoors. When we breathe we not only take in oxygen from the air, without which human life is impossible, but we also breathe out quantities of poisonous sub-

stances. In tuberculosis the body has more than its usual share of poisons, to offset which more than the usual amount of fresh air is needed. Everyone knows that to breathe the same air over and over again is harmful and actually makes us take back into our lungs poisons already thrown off. Besides this, careful experiments have shown that men lying in the open air breathe more slowly and especially that they breathe more with the lower part of the lung and less with the upper part of the lung, where tuberculosis is usually situated. This lets the diseased part of the lung rest, while the other part does the work.

Being out of doors is easy for anyone in summer. In winter it is also easy for anyone with fair vitality, if he has proper training and suitable clothing. Most people, either sick or well, soon learn to like it, and prefer to sit and sleep outdoors. A patient who will do this will find that he makes more progress in the cure of his disease in winter than he does in summer.

If on account of low vitality or very active disease you are given an inside room for a time during cold or stormy weather, remember that you need as much fresh air as you can get even then; so do not shut the window and fill your room with tobacco smoke as soon as the nurse turns her back.

SUNSHINE.

Direct sunshine kills the tubercle bacillus in a very few hours; therefore all rooms, bedding, clothing, and everything which the patients use must have as much exposure to the sun as can be obtained. Sunshine has a good moral effect and promotes cheerfulness. In certain selected cases, direct sunshine on part or all of the body (excepting the head) is valuable, but this treatment (which is called heliotherapy) has some grave risks and no patient should ever try it on his own responsibility, but only by the direction and advice of his ward surgeon.

HOW TUBERCULOSIS IS SPREAD.

It has been said by men who have studied the spread of the disease, that in 92 cases out of a hundred the germs are carried directly from one person to another in the sputum which the patient coughs or spits up. In cities and towns almost everybody breathes in or swallows a few tubercle bacilli now and then. If there are not too many of these, they are walled off without the patient being sick or ever knowing that anything happened to him. This is what some people mean when they say that everybody has a little bit of tuberculosis. This is true in the sense that every man does have a few living germs in him, but they are walled off so that they are

doing him no harm. If a man gets only a few germs and his body walls them off it increases his resistance to the disease, just as vaccination increases his resistance against smallpox. You can see, therefore, why children have much less resistance than grown people, and why they should not be brought to a tuberculosis hospital, and why a patient who is coughing and spitting up the germs should not remain where there are young children.

Every civilized man who has lived in cities has had so many of these vaccinations by breathing in or swallowing small numbers of germs that he is in no danger of catching tuberculosis unless one of two things happen. If he is broken down by overwork, by dissipation, or by some other disease, his resistance may become so low that even the germs which he has already will begin to grow. Or if he should take in tubercle bacilli in such large numbers, or so often, that they overcome his resistance, he is liable to break down with tuberculosis.

CARE OF SPUTUM.

Any patient with tuberculosis is liable at any time to spit up thousands of germs. Even if there are no tubercle bacilli, sputum contains other germs which produce disease and is therefore always dangerous. For the sake of other people always spit into a spit cup or a paper napkin. If you should happen to spill the contents of your spit-box, report at once to the nurse so that the place may be disinfected.

COUGHING AND SNEEZING.

When you cough or sneeze, sputum is sprayed into the air. For the sake of other people as well as for good manners, always use a paper napkin or a handkerchief to place before the mouth when you cough or sneeze. Other patients may give you colds or pneumonia by coughing in your face.

CARE OF MOUTH, TEETH, AND GUMS.

The majority of patients suffering from tuberculosis have pyorrhoea, decayed teeth, or abscesses in the gums. All these produce poisons, and the patient with tuberculosis should not have any extra poisons to take care of. Brush your teeth after each meal and once a day use a good tooth powder or a pure soap. Consult with your ward surgeon about the care of any cavities or painful teeth or broken roots which you may have. Do not soak your toothbrush; it makes it too soft.

TOBACCO.

The effects of tobacco are so different in different people that general rules can not be made. If you can stop its use without discomfort it would be best to do so. If your heart is rapid it may be neces-

sary to do so anyway. If you do smoke, do not inhale, as this irritates the throat and lungs; and when you smoke, limit the smoking to certain hours and consult with your ward surgeon as to what these hours should be.

ALCOHOL.

In tuberculosis alcoholic liquors are always harmful even in moderation. The patient with active disease who goes on leave and celebrates the occasion with even a mild spree always returns in worse condition. He can not take up the cure where he left off, but is set back weeks or even months. Even when the disease is apparently arrested, and the patient begins to take enough every week or two so that he is "feeling good," we always expect to see him back in the hospital sooner or later as an advanced case—usually sooner.

CLOTHING.

Clothing should neither be too heavy nor too light. Too much clothing is bad; it causes overheating and perspiration, following which the wearer is apt to be chilled and take cold. Woolen chest protectors do not strengthen the weak chest, but on the contrary keep the skin moist so that it is easily chilled.

Always wear enough clothing for comfort; if you go into a cold place, put on some more, and when you come into a warm place take off your overcoat and gloves. Always change immediately if your clothing is wet, and particularly keep your feet dry and warm.

STATE OF MIND.

A contented mind is of great importance in the treatment of tuberculosis. Food is digested better if there is pleasant talk and laughter at meals. A man can lose weight from discontent and worry alone. There is only one way for you to keep your mind contented during the treatment for tuberculosis. You must understand the disease and must understand why you need to do as you will be doing; you must have some idea of how the cure is brought about and of the different steps in the process. If you understand this, it will be easy for you to make up your mind, "*I will get well.*" Once you have done this and have decided to make getting well your chief business in life, and determine that nothing else must be allowed to break into your treatment, you can usually take it all good-naturedly, and even get quite a little fun out of it, especially if you want to be a good fellow and help some one else along a little bit. You can cheer up those who are discouraged; you can put a little more courage into those who have not the "nerve" to stick to treatment, and you can help some of those who are weak-minded and likely to yield to any temptation,

even if they know it is going to hurt them. A single "gloom" will often upset and discourage an entire ward, while one or two good fellows who understand the need of taking the treatment "right" may do as much good as a doctor.

OCCUPATIONAL THERAPY.

As soon as you are well enough so that it will not hurt you, it is a good thing to be busy a part of the time at something. A certain amount of reading, or some of the occupations which you can do without effort, help keep your mind off your troubles. Always consult with your ward surgeon about how long each day you should keep at these, as it is very easy to keep at them too long at first.

AMUSEMENTS.

One of the hardest things a ward surgeon has to do is to say "No" when the family and friends of the patient ask to take him out for rides or to entertainments or on visits during the early part of his treatment. It is equally hard for the ward surgeon when the patient wants to attend the entertainments given by the Red Cross and by others during the first part of his treatment, while the disease is still active. You can get well a great deal quicker and can help the ward surgeon in taking care of the other patients if you will tell him that you do not want to go to any entertainment until you can do it with perfect safety. Exciting games and especially gambling have been found to be very bad for patients with tuberculosis. The strain on the nerves uses up strength and makes both the heart and the lungs work faster.

VISITORS.

In some private sanitoriums they do not let in any visitors at all during the early part of the treatment. If visitors come too often, or if they stay too long, they may be just as bad for you as a long walk would be. If a visitor comes to see one man while the others are resting, it always disturbs some of them, and usually disturbs just the ones who need their rest the most. In the first letter that you send home be sure and explain to them all that it will be better if they will ask the doctor or nurse how long to stay and how often to come. To be fair with the other patients, tell your friends what the visiting days and hours at the hospital are and tell them to be sure and not to come at any other time.

BABIES AND YOUNG CHILDREN.

It can not be made too strong when we try to tell you that you should never allow a baby or young child to be brought to the hospital to see you. It is still more dangerous for you to go home to see it. You

should not allow your children to live in a house or a room where you yourself or any other patient with tuberculosis has lived unless this room has been thoroughly cleaned and opened for several days to air and light. It is better yet if the board of health can inspect the rooms and attend to the things that ought to be done. It is in childhood that a great deal of the tuberculosis is caught which does not show itself until long afterwards. If you allow your child to be exposed to tuberculosis a few years from now the child may die of tuberculosis, even though it does not seem to hurt the child just now.

Chapter II.

COMPLICATIONS AND SPECIAL POINTS.

HEMORRHAGE.

Bleeding from the lungs is almost never fatal at the time of bleeding. You should have the right care during and after bleeding, so as to avoid the bad effects which sometimes follow. Very often a small or moderately severe hemorrhage is followed by a decided improvement; sometimes bleeding from the lungs seems to mark the beginning of a cure. If you should happen to have a hemorrhage try to remember these points:

Don't get scared; it is not going to kill you.

Lie down with your head just a little bit raised.

Loosen up all your muscles and take it easy.

Don't worry about being alone; loud calling for help or walking any distance to get help is liable to make the bleeding worse.

You will have to cough a little bit to get the blood up, but don't cough any more than you can help, and then do it as easily as you can.

PLEURISY.

Most patients who have tuberculosis have more or less pleurisy. There may be a slight shooting pain or there may be intense suffering. If you are subject to pleurisy try not to let your chest get chilled. Always report a pain in the side to the ward surgeon, but remember that there are other things, such as neuralgia, strained muscles from coughing, etc., which may cause pain in the side. While pleurisy is very uncomfortable, it may help you a little to know that if you are especially subject to pleurisy you are likely to get well faster than you otherwise would with the same amount of disease. This is a fact which we have learned by experience; one of the reasons is that pleurisy helps to keep that side of the chest at rest; another reason is that it hurts, and the pain makes the patient follow the treatment better.

INDIGESTION.

The poisons of tuberculosis upset the stomach in a great many cases. The appetite is likely to fail and the patient often thinks that some different food, or the same food, if cooked differently, would be just what he wants. As soon as he gets something else to

eat he may have one good meal, after which he is the same as before. The best way to do is to eat only nourishing foods, never eat more at a meal than you can digest easily, be sure to chew the food well and not eat too often. If you try to talk cheerfully at meals and forget all trouble it often causes a better appetite and makes the food more easily digested. There are some uncommon kinds of stomach trouble in tuberculosis which need small amounts of food every few hours, and once in a while a case gains weight better on two meals a day than on three. But almost all patients do better on three meals a day, without eating between meals and without special dainties. So do not try ideas of your own, but talk it over with the doctor, and remember that the best treatment for indigestion is to follow the treatment for tuberculosis. When the lungs get better the indigestion goes away, often in only a few weeks.

DIARRHEA.

This may be due to indigestion only, or it may be very important. Be sure to report it at once to your ward surgeon.

CONSTIPATION.

This is very common among tuberculosis patients. If you are eating too much meat, milk, and eggs, a better-balanced diet may cure the constipation. A large number of cases are relieved by drinking a glass of water on first getting up in the morning and at four or five other times during the day. Green vegetables and oatmeal are very good for people who have constipation. Besides these things, try to use the toilet at the same time every day (the best time is usually when you first get up or else a little after breakfast). Try to empty the bowels but do not strain, and get your bowels into the habit of moving regularly. Sometimes you may need a little help, especially when you are at complete rest, to get the bowels into the right habit. If you do, be sure and consult with your ward surgeon, as the bowels should never go more than 24 hours without a movement. But do not take medicine unless the doctor orders it.

NIGHT SWEATS.

These are a symptom of active disease. You should always tell the ward surgeon about them, because he ought to know if you are having them. They usually come after some fever in the afternoon or evening. Stick close to the treatment and do not sit up or walk around. Absolute rest is needed until the fever and the night sweats disappear. Patients who are in rooms instead of on the porches are more liable to have night sweats, because of lack of enough fresh air. Keep the windows wide open and stay in bed.

COUGH.

A certain amount of cough is necessary to clean the sputum out of the lungs. Most patients with tuberculosis cough a great deal more than they need to. If you will begin to use your will power, you can control more than half of your cough, and when you do need to cough you can learn to make it bring up the sputum without tiring you all out. If it can possibly be avoided it is better to take no medicine to quiet a cough, because in the long run these medicines only make the cough worse. If the cough is troublesome, tell the ward surgeon about it; sometimes some simple remedy will help to get you started to control it.

NERVOUSNESS.

The poisons of tuberculosis are particularly liable to make you feel nervous. Even if you are not naturally nervous you are likely to be so at times on account of the disease. Sometimes when a patient is very nervous the poisons of the disease act like a stimulant to him. Such a patient feels better when he is up moving around than he does when he is in bed. It is an unlucky thing for him if he does feel this way, because when he is up he is getting worse. If such a patient will remain at complete rest in bed and not get up at all, usually in from four to six weeks his nervousness goes away and he begins to feel better. This time he is really getting better. It is very bad for such a patient to take soothing medicines or any kind of "dope" for his nerves, to make him sleep, because as soon as the effects pass off, his nervousness is worse than ever. The one best cure for nervousness is for the patient to understand the treatment for tuberculosis, so that he does not fret and does not think that he would be better if he got up; and then for him to carry out the treatment.

FEVER.

Fever is a symptom of the disease. You should not take any medicine for fever itself, because the same treatment that cures the disease will cure fever. Fever is one of the most important signs that the disease is not yet entirely walled off. It is very important to get exactly the right temperature every day. You can help in your own treatment if you do not drink anything very cold or very hot just before temperature taking time, and if you will keep the lips tightly closed while the thermometer is in the mouth, and if you will be careful not to breathe cold air through the mouth for 15 or 20 minutes before temperature time.

CAVITY.

If the inside of a tubercle softens, it is likely to break through into a bronchial tube, and the soft inside be coughed up. There is left a vacant space which is called a cavity. Cavities are very common, but we can find them only when they are as large as a hickory nut, or even larger when they are in the center of the lung. The patient is really better off when he gets rid of the inside of a big tubercle. The wall around the cavity does not have so much poison passing through it, and therefore can grow and get strong faster. You have probably had a boil which broke and left a cavity, but it got well all right, and it would not get well until it did soften and the core came out and left a cavity. If you gouge out a piece of flesh, you have a cavity, but it heals. Even cavities in bone heal in a few weeks. There is only one kind of a cavity which never heals; that is a cavity in a tooth, but you would not get discouraged and think you could never get well just because a dentist told you that there was a cavity in your tooth. We have many sets of X-ray pictures which show healing of a cavity in the lungs.

If you have a cavity, do not think that it is anything to be discouraged about, but, on the other hand, do not think that it does not mean anything. Cavity means that the disease has advanced far enough to destroy some lung tissue, and that you must expect to take a long course of treatment to become an arrested case. It also means that you have so much resistance that you have been able to build up a wall around the cavity, and is an indication that you will be able to also build walls around the tubercles which have not emptied themselves and become cavities. It is not the cavity that is making you sick, it is the tubercle which has not emptied itself and become a cavity that is doing you harm. What you cough out will not hurt you, it is the poison which goes into the blood which causes fever and loss of weight and all of the other symptoms.

CLIMATE.

We have learned a great deal about the treatment of tuberculosis in the last few years, but there are still some doctors who do not understand it. Everywhere in the United States as soon as the doctor who does know how to treat it finds a case of tuberculosis he usually tells the patient to go to some other climate. Some years ago when "consumption" usually meant death the doctor was very sure that the man would not get well if he stayed home. In this way they got the idea in every part of the country that there was some other place where people might get well of tuberculosis. Hundreds of people with tuberculosis went to some other climate;

a few came back and told their friends about the wonderful climate which had cured them. The ones who died never came back to do any talking about it. In this way people got the idea that climate had a great deal to do with the cure of tuberculosis. As a matter of fact it has very little to do with it. Changes of altitude affect the heart at first. If a patient with a weak or rapid heart goes to a different altitude he is liable to get worse. The difference in the weight and moisture of the air at sea level and in the mountains often causes difficulty in breathing for a while after a change. If a patient has been a few months in one climate or at one altitude, any great change usually has a bad effect upon him at first. In any case you can see that the treatment which you are taking will be upset by a trip, that the wall around the tubercle will be more or less broken down by the effect of the excitement and effort of the trip, and that you will have to start all over again, with the disease a little further advanced than it was when you first began the treatment.

Many eminent specialists are of the opinion that the average patient loses more than he gains by traveling in search of a better climate. There is no perfect climate, and no perfect place except in heaven, and the bad things about the new place may be unpleasant in ways the patient did not expect. In England and in Scandinavian countries the climate is more disagreeable than it is anywhere in the United States, and yet the sanitoria there get results that are very little different from those which they get in the most pleasant climates. This shows that it is the treatment that counts, and that climate has very little to do with it.

PATENT MEDICINES AND STIMULANTS.

There is no medicine which can cure tuberculosis. The germ is covered with a wax coating and it can not be hurt by anything which will not first kill the man. There are hundreds and hundreds of advertised cures for tuberculosis; the unlucky patient spends his money for "Sure Cures" which should have been called "Sure Killers," and when his money is gone, he is told that he did not carry out the cure and that is why he did not get well. Do not take any of these and do not take any medicine that your friends tell you is good for cough, or is a good tonic or a good anything else. All such medicines are either a mild form of "dope" which only gives you a false sense of being better, or else they contain stimulants which make the heart beat faster and lead you to do more than you ought to. A stimulant which patients often use too much is coffee. The best rule is to take coffee only at breakfast and not even then if you are very nervous or if the doctor thinks you had better not use it.

LEAVE OF ABSENCE.

Getting well is not like a job which you can work at for a while, and then do something else and come back and take up the job where you left it. The tubercle bacillus never takes any leave of absence. It is always making poisons which will destroy the wall you have built up around it. All that was said about passes is true about leaves of absence, and the longer you are absent the harder it is not to break your treatment. Do not ask for leave of absence—

1. As long as there are signs of activity of any kind.
2. Until after at least three months of treatment.
3. For long leave, until after six months of treatment.
4. If the weather or climate are bad, either for the trip or at the place you want to visit.
5. If there are complications which might be made worse.
6. For several weeks after hemorrhage or even slight blood spitting.
7. When the trip would be so long as to wear you out.

If you have been treated at some other hospital for several months and got worse again after you left it, it is almost certain that you left too soon. If you have had treatment before, and it did not result in permanent improvement, your treatment this time should be longer and better. Do not let anything break it up. "Do it right this time."

WHEN TO LEAVE THE HOSPITAL.

You have already learned how the wall around the disease must be built up, and the body made stronger little by little. Exercise must be increased very slowly and we must keep watch all of the time for little signs that will show when you are doing just a little bit too much. Do not leave the hospital as soon as you are able to take one or two hours' exercise a day. You may be able to do this and yet everyday life at home may be too much for you. Of those who leave the hospital as soon as they can walk a mile without fever, a certain number always break down sooner or later and have to come back for more treatment. It is much better to stay where the doctor can watch you and not to think that because you can do a little work at the hospital you could just as well do it somewhere else. Somewhere else there will be nobody to see the danger signals until it is too late. And it almost always happens that a man can not keep the rules of treatment as well at home as he can at the hospital. The stronger and better you are when you leave the hospital the more certain it will be that you are cured for good. The best thing you can possibly do is to stay under treatment for a while after all signs of any kind of activity have disappeared. During this last part of

the treatment, you can be under the doctor's care while you begin to do real work; a little bit at first, and then more and more, until you are doing at least half of a day's work while the doctor is still watching you. Actual work is the real test of fitness, and we would like to see every one of our tuberculous patients stay with his treatment until it is certain that he will not relapse after a little work.

In many cases this work test can be made part of vocational training. It is best for you to follow the same trade you did before you were sick, unless this is too hard or too heavy for you, or unless it is one which is bad for anyone who has had tuberculosis. Be sure and talk this over with the Vocational Board instructors at your hospital when your ward surgeon tells you that you are ready. Perhaps you can take this work treatment and at the same time be starting to train yourself for a better and easier position in your old trade.

Chapter III.

RULES.

We wish that we did not have to have any rules; we would like to have the patients all feel that the only reason there is a hospital is because they are sick and have to be taken care of. We would like to have them all know the treatment of tuberculosis so well that they would do everything we asked them to do without making any mistakes, and that they would know what hours to keep, and how a hospital should be run, and not need any directions at all. But you can see that all the patients can not know all these things in the beginning. Besides this, with so many patients we have to have orders as to how things must be done, because if each did things in a different way everything would get all mixed up.

The following rules are only short ways of telling the things we have to do to get well of tuberculosis, and the things we have to do to run a hospital. We want you to help us by reading them over carefully and by trying to carry them out as far as you can. We feel sure that you want to do all you can to get well, and that you do not want to keep anyone else from getting well. We want to do all that we can to help you to get well.

If there is any patient who does not even try to get well, and who is not willing to give a chance to others who do want to, it can not do him any good to stay in the hospital, and the only thing to do is to tell him that he had better go.

GENERAL RULES.

MONEY.

Deposit your money or valuables with the officer of the day or the ward surgeon, who will give you a receipt. You can draw any or all of it each day when the safe is opened. Do not lose the receipt, because it will take you longer to get the money if you do. You may keep your money with you if you want to, but it is of course at your own risk. If you lend money or other things to anyone it is also at your own risk; the hospital is not responsible.

REST HOURS.

In most hospitals the rest hours are from 9 to 11 in the morning and from 2 to 3 in the afternoon, with a short evening rest before the temperature and pulse are taken, and "lights out" at 9 in the even-

ing. This does not mean that if you merely keep these hours you are taking all the treatment for tuberculosis. In the first part of the treatment you should rest all of the time. As you improve, you are given more and more exercise, until finally you will be exercising or taking vocational training part of the time, but you will not do this in the ward. All patients who remain on the ward should lie down during the rest hours. Even while you are a 24-hour bed case there should be certain hours when you can be perfectly quiet and not be disturbed. The rest hours of a hospital are hours when all patients with active disease should be lying down and when there should be no noise, no visitors, no smoking, and as little moving around as is possible. Try to make the hospital as quiet as possible during the rest hours. If you do this you will help all the rest of the patients to get well. Do not talk or smoke or move around or make a noise after the lights are out if you can possibly help it. If everybody will quiet down at the same hour every night, all the patients soon get the habit of going to sleep at the same hour; and they will all get well a great deal faster, because it is during the night that the greatest gain in treatment is made. One man talking on a ward is robbing 20 or 30 others of just so much treatment.

WARDS.

Every patient coming into a hospital should have at least four days of complete rest in bed while the doctor studies his case. It may take much longer than this to determine which ward is best suited for his treatment. Afterwards, as his condition changes, he will advance or graduate from one ward to another, according to the amount of rest or exercise needed. If he has active tuberculosis he will usually need at least six weeks of complete rest in bed; in more advanced cases several months may be needed.

VISITORS.

Tell your family and friends, or write to them, what the visiting days and hours are. Tell them not to stay too long, and not to come at other times, because they disturb the other patients and because your own treatment should not be broken. Tell them never to bring a young child to the hospital.

CONTRABAND.

1. *Alcohol.*—Do not let anyone bring to you, and do not have in your possession, alcohol in any form, nor any medicine except that which the ward surgeon orders.

2. *Weapons.*—It is strictly forbidden by Government orders for patients in the hospital to have any firearms or deadly weapons. All packages brought into the hospital may be examined by the medical

officer in charge. This is a common rule in all hospitals. We do not want to make this rule disagreeable and hope that you will not make it necessary to do so.

FOOD.

Food of all kinds, candies and sweets, etc., must not be brought into the ward except by permission of the ward surgeon. Tell your family and friends not to bring you things to eat except fruit.

PROPERTY.

Do not take any Government property from the ward or room on which it belongs. Do not take spoons, plates, cups, or other articles from the dining room.

WINDOWS.

The windows of a ward should be opened and closed by direction of the doctor or nurse. If one of the patients feels chilly, he should put on more clothing and not close the windows.

PROMPTNESS.

When you are well enough to be up and around always be prompt at meals. Meals are better if they do not stand after cooking, and if all the patients are prompt they get much better food. After you are so far along in your treatment that you are at work or on exercise, always be on hand 15 or 20 minutes before the time for taking temperatures and sit down quietly and read or talk; do not walk around. If you do this, you will help the doctor, because the record of temperature and pulse will be better.

SERIOUS OFFENSES.

Profane and obscene language is strictly forbidden and is sufficient cause for dismissal from the hospital.

Gambling is strictly forbidden; raffles and lotteries must have special permission from the medical officer in charge.

Disorderly conduct, dishonesty, brawling, and fighting are serious offenses and count against a patient.

PASSES.

Do not leave the hospital grounds without permission. Do not ask for a pass until you are well enough so that it will not break up the treatment. Do not ask for a pass except at the proper time. If you expect a pass to be away overnight, always ask for it 24 hours in advance. Always carry your pass with you, as it is subject to inspection. Failure to return on time when on pass is considered a breach of confidence and counts against a patient in his record.

REQUESTS FOR TRANSFER.

Frequent transfers usually result in the patient not being cured at all. If you think that you would be benefited, consult with your ward surgeon. If there is a good reason for transfer, he can help you get it. If a good reason can not be shown, there is no use of applying, as it would be impossible to get it anyway. Do not write to influential friends or to the department at Washington about transfers; no transfer is ever given unless recommended by the medical officer in charge of the hospital.

TRANSPORTATION.

Railroad transportation can not be given to patients who leave the hospital before treatment is completed, nor to those on leave of absence.

COMPLAINTS.

Your ward surgeon wants you to tell him about anything troubling you that could be made better, so as to make you more comfortable. He is your doctor. He wants to correct anything wrong. Tell him your troubles. If there is something that you feel is entirely wrong and of great importance, ask to see the medical officer in charge or write him a letter and sign your name. Make your complaint promptly while the matter is fresh. Do not write to the Washington offices, as your letter would be at once sent back to the medical officer in charge of your hospital for action.

RULES TO PREVENT THE SPREAD OF DISEASE.

The rules which follow are to protect you and other people against the spread of disease. When you know that not only tuberculosis but that many other diseases, such as common colds, catarrh, grippe, bronchitis, throat troubles, diseases of the gums, and a whole army of diseases, are carried in the sputum, you can see that these rules are just plain common sense. Try to keep these rules and help to keep disease from spreading around by telling others that they ought to keep them too.

Never spit anywhere except in regular sputum cups, or in paper napkins or handkerchiefs which can be burned.

Always put paper napkins and handkerchiefs which you have used, all cigar and cigarette stubs, fruit peelings, and every other kind of trash and dirt, in the trash cans or bags so that they can be burned. Sputum cups and holders made of metal should be disinfected regularly. Put used sputum cups where they can be collected.

Never cough or sneeze without holding a paper napkin in front of your mouth.

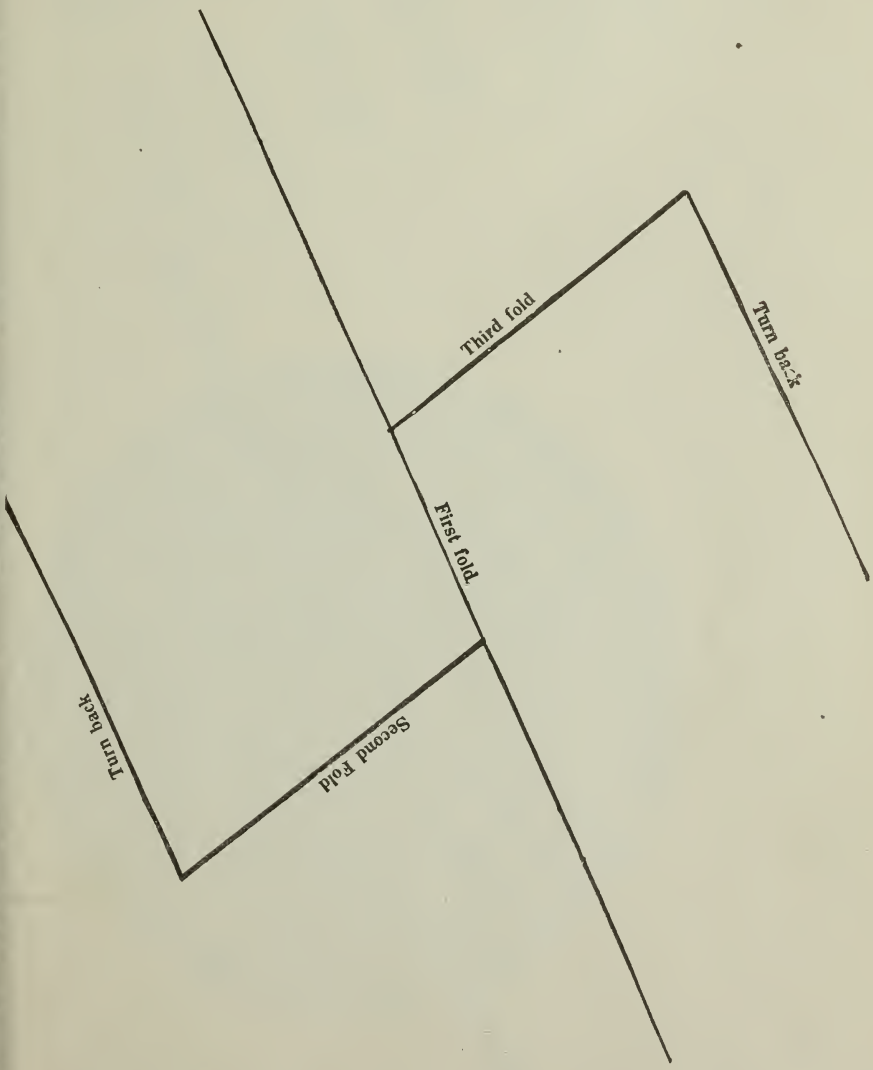
If sputum is spilled anywhere, tell the nurse at once so that the place can be disinfected.

When you brush your clothing, do it in the open air and not inside the rooms or wards.

Keep clean shaven and have the hair cut; keep your clothing neat and clean.

Wash your hands before eating and brush your teeth afterwards.

MAKE YOUR OWN DRINKING CUP—IT'S THE SANITARY WAY.



A PIECE OF CLEAN PAPER 8 INCHES SQUARE IS ALL YOU NEED.
A SIMPLE MATTER TO FOLD.

4.09
.3m
.30

COMMUNICABLE DISEASES

THE LIBRARY OF THE
DEC 9 1930
UNIVERSITY OF

UNDERGRADUATE LIBRARY
ROOM 123

THE COMMUNICABLE DISEASES

by A. M. STIMSON
Medical Director, U. S. Public Health Service

MISCELLANEOUS PUBLICATION NUMBER 30

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

United States
Government Printing Office
Washington : 1939

For sale by the Superintendent of Documents, Washington, D. C.
Price 25 cents

614.09
L113m
no.30-31

PREFACE

By James Frederick Rogers, M. D., *Consultant in Hygiene, United States Department of the Interior, Office of Education*

From Evil Spirits to Microbes—

Many diseases are communicable but, fortunately, information concerning those diseases is also communicable and it is highly appropriate that this knowledge should be furnished by the United States Public Health Service. That Service has long been engaged in preventing the importation of such diseases and it has served as a powerful aid in their control within our borders. In its early days and for a century later, the Service had little to tell the public about communicable diseases other than that they were communicable, or "contagious," or "infectious," for those fearsome words nearly summed up what was known. We knew that certain ailments were somehow transferred from the sick to the well and, after many thousand years of experience, we had also learned to keep the sick from associating with their fellows until the telltale signs of disease had disappeared, when it would again be safe to resume their companionship.

Some diseases are slow going and may be communicated over a long period. In ancient Babylonia and in Palestine persons with such ailments, notably leprosy (or what went by that name in those days), were driven out of the camp or city and made to remain at a distance from their more fortunate fellows until they were fully recovered or dead. In Europe in the Middle Ages they might even be required to carry a bell in order to give warning of their approach. Other communicable diseases are rapid in their development and progress. They spread like a wave over a community, lay a considerable portion of the population on its back or in its grave, and are gone for the time. Where people were huddled together as was the case on ships in early days, it was observed

that those exposed either had such a disease, or they were not going to have it, within a comparatively short space of time. In the fourteenth century the public health servants of Ragusa, a city of Dalmatia, forbade ships suspected of carrying cases of the Black Death, along with more desirable cargo, to land their passengers, crew, or goods for the space of 30 days, or until they were unlikely to be a menace. In the Italian tongue this period was known as a "trentina." It was later decided that it would be safer to extend this period from 30 to 40 days or to a "quarantina," and this method of control was soon adopted by other Mediterranean ports. Our Public Health Service prevents the communication of disease from abroad to our citizens, but, through its possession of the knowledge presented in the pages of this pamphlet, not many travelers are detained and seldom are any of them held for 40 days. However, the historic word "quarantine" still stands for a period of isolation no matter what its length.

Solving the Mystery—

The "trentina" and "quarantina" reflected a vast step forward in man's groping after definite knowledge concerning the cause of contagious diseases. He had passed that dismal stage when they were looked upon as the work of spiteful spirits, or a visitation by a vengeful deity. Evidently the practitioners of preventive medicine of the Renaissance realized that human beings, or some other very earthly go-betweens, were involved for they burnt the bedding of the sick, aired their rooms, and made use of those very practical weapons of sanitation—soapsuds and sunlight.

Back in the thirteenth century, Roger Bacon, in his little book on the preservation of health, mentioned first among the causes of sickness "living creatures which infest the air and cause *infection*." This was a bold guess by this father of modern science for no one had ever seen such "living creatures." As late as 1683 another writer on hygiene remarked that people "believe that the plague, smallpox, the itch, and other mangy and leprous distempers are catching because the effects

immediately follow and they see them externally in the flesh; therefore most of the persons do both fear and shun communicating with such." He admitted, however, that the more exact "nature of infection and how it is spread and how to be avoided is very little or scarce at all understood." Just about this time a Dutch lensmaker named Leeuwenhoek produced a glass by means of which he was able to see "with the greatest astonishment" minute creatures moving about in a drop of water and in his saliva. These microscopic forms of life proved to be related to those we now know have the power of producing disease. It was nearly 2 centuries, however, before these seemingly insignificant organisms were finally incriminated as the fearsome go-betweens of communication.

Besides that skilled maker of microscopes we have to thank Henle, Schwann, Davaine, Pasteur, Lister, Koch, and other workers in many countries for solving the age-long mystery. Nor should we overlook the name of Edward Jenner who, putting two and two together from his observations in medical practice, was able to prevent a most dreaded disease although to this day no man has seen the organism which may be transferred from the victim of smallpox to his neighbor who is unprotected by vaccination. So difficult was it to escape this disease, in the days of its undisturbed communicability, that many persons were willing to contract it from what seemed a mild case, by direct transfer of material from the sores of the sick, in order to escape possible death from a severe infection. Jenner did away with this dangerous procedure from which many lost their lives and saved millions from the disease by borrowing his material for vaccination from the cow. In this animal the causal agent assumes a form that can be handled by the human body with less effort and without fear as to the outcome.

The Cause of the Trouble—

The transfer of a disease from one person to another involves at least a third party. This party of the third part may be

visible to the naked eye (as is the case in hookworm disease) but it is usually microscopic and it is because of the variety of these participants in transfer that we have so many different diseases.

Small as they are, microbes which cause disease differ enormously in size and they present a variety of shapes, some being more or less spherical ("cocci"), some like a cylinder or rod ("bacilli"), and some curved or twisted ("spirilla"). But it is not because of such characteristics that they produce their differing effects. The bacillus of leprosy and that of tuberculosis look alike so far as they can be made visible, and there are harmless germs which resemble them both. The all important feature of each is its chemical make-up, for even such tiny forms of life differ decidedly in their essential substance. They, in themselves, may be highly poisonous and the materials which they produce in the process of their rapid growth and reproduction may also be very harmful. Human beings also differ somewhat in their chemistry; if this were not the case we would all be equally responsive to the organisms of disease. We would be equally ill or not at all affected by their presence.

A communicable disease is a chemical warfare in which the laboratories of the body are set to work making appropriate munitions to check the rapid multiplication of the invaders and to neutralize the effects of their weapons. After a successful resistance to some organisms the body is able to maintain its defenses against a second inroad and this blessed state of preparedness is called immunity. Scientists, besides Jenner, have been clever enough to help us in our struggles with these unseen foes by preparing for our use materials of war in their man-made laboratories and with the assistance of our animal friends.

Methods of Communication—

The germs of some diseases find lodging and flourish in the breathing organs and they are thrown out of the body in the acts of sneezing and coughing. We speak of diseases

caused by such organisms as spray-spread or spray-borne because the droplets of saliva or mucus from the mouth or nose sprayed into the air may be breathed in by an unsuspecting and unprotected neighbor. The germs of a few diseases find lodgement in the skin or the more delicate linings of the openings of the body and may be communicated by intimate contact with the body of another person. Other organisms develop in the food canal, are discharged from the intestine and, if cleanliness and care are not observed, find their way directly or indirectly into the food or water consumed by another person. Insects may help in the communication of these and other germs, for many microbes can travel on the foot of a fly and if the fly carrying such passengers lands on a pie or in a pitcher of milk the transfer may readily be made. Other insects are all important go-betweens in some maladies and these are mentioned in detail in the following pages. The part they play now seems plain enough but the discovery of that role was anything but simple or safe and its telling is one of the thrilling stories of history.

What Happens After Communication—

After the transfer of the organisms often nothing happens because the person has been prepared by past experience or by the protective aid of a physician. The germs find the soil most inhospitable. In other cases nothing *seems* to happen for a few or for many days, but something is happening behind the scenes. The organisms have not only found a lodging but are multiplying at a rapid rate. This period is called that of incubation. Disease germs especially enjoy the temperature of the body but they are being more than incubated. They have found those other necessities for their development—moisture, darkness, and suitable food. Headache, sore throat, chilliness, fever, loss of appetite, weakness, or whatever we notice in the way of "symptoms" soon tell us that the body is reacting to the presence of the foe and that the war is on. It is time to take to our bed and call a doctor. These earliest indicators of infection are much alike in different diseases and

are of little help in deciding what germ we are dealing with and how much trouble lies ahead. But they are very important not only in looking after our own welfare but for the protection of others, for the disease may be highly communicable in these early and ill-defined stages.

Epidemics—

Microbes we have with us, or with some of us, always, for most of the harmful ones do not long flourish outside a human body and we may often be their unsuspected and unsuspecting hosts or carriers. There are years when they are relatively harmless and few people are ill on their account and there are seasons when they are particularly vicious, in which case we say we are having an epidemic. The presence and extent of such an outbreak depends in part on whether a similar outbreak has occurred recently leaving a considerable number of the population partly or wholly prepared by their previous experience with the organism. It also depends on whether the organism is unusually virulent, for microbes have their ups and downs from year to year. Just why this is the case is not clear but we know that their natures can be changed by artificial conditions of living in the laboratory. Whether or not we are ill and whether or not a disease is prevalent we cannot neglect precautions against the communication of its cause.

Door Openers—

Some communicable diseases are more or less seasonal. The number of cases and the number of deaths run higher in certain months of the year than in others. This is notoriously the case with colds. As the name indicates, they belong chiefly to the colder months. Pneumonia is also far more frequent in winter than in summer though its cause is with us the year round. Because of the cold, people live more indoors and in closer contact, but mere contact is not the only reason for frequent infection. Cold is man's greatest enemy next to starvation, and prolonged chilling somehow renders the body

more susceptible to invasion with organisms which find lodgement in the nose and throat. Besides, prolonged exposure to cold, poor feeding, loss of sleep, fatigue, and illness from other causes have an influence in reducing our powers of resistance to these microscopic enemies. It is highly important that we keep ourselves at all times in the best of condition and when unavoidably chilled, exhausted or ailing, that we take the time and trouble of restoring our bodies to that condition of balance and of preparedness which is called health.

Letting in the Light—

Great progress has been made in the control of communicable diseases. Cholera, plague, typhus, yellow fever have been banished from our shores though in some lands they still take a terrible toll of life. The word smallpox no longer causes a shudder, while typhoid and tuberculosis are far less frequent than formerly. Unfortunately, there is much that we do not know about infantile paralysis; pneumonia is a powerful destroyer, while influenza and colds are all too common. However, if we would put into practice all the knowledge furnished in the following pages the number of the sick and of premature deaths would be greatly reduced. Fortunately, there are not as many parents nowadays as there formerly were who think their children should have the measles or whooping cough "and get them over with" (and possibly pass off the scene or be injured for life) and not many persons are so foolish and vicious as to risk their lives and imperil their fellows by concealing the fact that they have a communicable disease. Syphilis and gonorrhea, once considered unmentionable, have been brought out in the open and are described in the following pages.

Sunlight is a most powerful germicide and the light of knowledge is our most potent agent in bringing about the prevention of disease and the promotion of health.

ACKNOWLEDGMENTS

It is desired to acknowledge the assistance of Dr. J. F. Rogers of the Office of Education, Department of the Interior, in preparing the preface to this booklet and the suggestions to teachers for utilizing the material, and to Surgeon A. J. Aselmeyer of the Public Health Service for preparing the chapters on gonorrhea and syphilis. In furnishing many of the photographs for the three illustrated sections, the Farm Security Administration, the Works Progress Administration, Life Magazine, Pictures, Inc., and the Washington Star rendered a valuable service.

CONTENTS

	Page
Amebiasis (Amebic dysentery)	4
Amebic dysentery (Amebiasis)	4
Ancylostomiasis (Hookworm disease)	5
Bacillary dysentery	7
Botulism	9
Brucellosis (Undulant fever)	10
Bubonic plague (Plague)	47
Chancroid	13
Chickenpox (Varicella)	92
Cholera	13
Common cold	15
Dengue	18
Diphtheria	19
Encephalitis (Sleeping sickness)	24
Food infections and food poisonings	26
German measles (Rubella)	66
Gonorrhea	27
Hookworm disease (Ancylostomiasis)	5
Hydrophobia (Rabies)	55
Impetigo contagiosa	31
Infantile paralysis (Poliomyelitis)	51
Influenza	33
Leprosy	35
Lockjaw (Tetanus)	76
Malaria	36
Measles (Rubeola)	67
Meningitis (Meningococcus meningitis)	39
Meningococcus meningitis (Meningitis)	39
Mumps (Parotitis)	44
Oxyuriasis (Pinworms)	41
Paratyphoid fever	43
Parotitis (Mumps)	44
Parrot fever (Psittacosis)	53
Pertussis (Whooping cough)	45
Pinworms (Oxyuriasis)	41
Plague (Bubonic plague)	47
Pneumonia, acute lobar	49

Page

Poliomyelitis (Infantile paralysis) 51
Psittacosis (Parrot fever) 53
Rabies (Hydrophobia) 55
Rheumatic fever 60
Ringworm 62
Rocky Mountain spotted fever 64
Rubella (German measles) 66
Rubeola (Measles) 67
Scarlatina (Scarlet fever) 70
Scarlet fever (Scarlatina) 70
Septic sore throat 72
Sleeping sickness (Encephalitis) 24
Smallpox (Variola) 93
Syphilis 73
Tetanus (Lockjaw) 76
Trachoma 79
Trench mouth (Vincent's infection) 96
Trichinosis 80
Tuberculosis 83
Tularaemia 86
Typhoid fever 87
Typhus fever 90
Undulant fever (Brucellosis) 10
Varicella (Chickenpox) 92
Variola (Smallpox) 93
Vincent's infection (Trench mouth) 96
Whooping cough (Pertussis) 45
Yellow fever 97
Glossary 99
Suggestions to Teachers for Utilizing the Material 109

THE COMMUNICABLE DISEASES

Introduction

In the laboratory, in the clinic, in thousands of doctors' offices throughout the land, in your health department, people are working to improve the public health. Will they have cooperation? Will they have the cooperation of every citizen? Or will people resent the regulations which must be made? Will they follow old superstitions, outworn misbeliefs, continue to buy patent cure-alls while science knocks unheard?

If people understand the nature of disease, if they understand why certain control measures are necessary, they will cooperate. They will obey reasonable rules and regulations. They will go to their doctors when symptoms appear, and shun the quack and the patent medicine vendor. Thus, more people will get well, more people will stay well, more people will live longer.

This book is intended as a source of dependable information for students in high schools and junior colleges on one class of diseases—the so-called communicable diseases. These are the diseases which are kept alive by being carried in one way or another from a sick person to a well one. They are the "catching" diseases, and they still play a very important part in causing sickness and death, although more progress has been made in their prevention than in any other class. They all have one principal cause in common, and this is some small form of animal or vegetable life which gets into the body and by its growth there causes the disturbances of health which we call disease.

This book considers only those communicable diseases which it is thought are the most important for people living in America at the present time to know something about.

Sometimes a disease is included which is now quite rare and

from which there is no danger to be expected at present. Such diseases are included because they illustrate vital principles on which control has been accomplished. Some of these methods offer strong hope for the final control of commoner diseases when we shall have learned more about them.

Many of the details about each disease are taken from a publication[1] prepared by a group of experienced doctors and sanitarians which represents the best knowledge and opinion of the present time. No one of the men who prepared this report would claim that it is the last word on the subject. Science does not stand still, but always searches for more knowledge and for new light on old, so that in the course of years many of the statements in this book will no doubt have to be modified. But if the student becomes familiar with what is in this book, he will not have much difficulty in keeping up with progress.

This book deals only with the communicable diseases, but the student may have some curiosity as to what other sorts of diseases there are. We will refer briefly to some of them.

There are a very few diseases which run in families and are transmitted from parents to their children. There does not appear to be much that can be done to prevent these, but certainly two people who both have the same hereditary tendency to a disease should not marry and have children. Fortunately, a number of diseases which were formerly thought to be hereditary have now been shown not to be so. They were really examples of family transfer due to living together under the same conditions, and something can be done to prevent them.

Then there are diseases which are due to poisons, such as metallic poisons like lead. The general public is now fairly well protected against most of these, but special provisions have to be made to protect persons such as painters who work with such materials.

---

[1] The Control of Communicable Diseases. Report of a Committee of the American Public Health Association. Reprint No. 1697 from the Public Health Reports, U. S. Public Health Service.

Another important class of diseases includes those which are due to faults of nutrition or diet. These can occur from eating too much total food or too much of some one kind, but very important diseases such as rickets and scurvy are also caused by leaving out of the diet some very necessary constituent.

Finally, we shall refer to the so-called degenerative diseases. These are most commonly seen in people who are growing old and whose tissues are losing the ability to carry out their functions. Still, it is believed that many of these conditions really had their beginning in diseases of other classes from which the patient had suffered in earlier life, and that they can to an extent be prevented.

Although this book deals with diseases and has to mention them a great many times, the real purpose of the book is to preserve and improve health. It is like being obliged to describe a gloomy dark room in order to appreciate the blessing of letting the sunshine and air in by opening the window. In this case the air and light are represented by scientific knowledge, for it is only by the constructive use of the mind that human beings can hope to overcome the obstacles which they find in Nature to achieving health and happiness.

Since many of the terms used in this book may be unfamiliar to the reader or may be used in a special or exact sense with which he is unacquainted, a glossary has been prepared and appended, and free use of it is strongly recommended.

The diseases which will be discussed in alphabetical order are mostly of such importance that they are now, or in the opinion of many sanitarians should be, compulsorily notifiable in most communities. That is, doctors and (in some cases and places) other persons who know of the existence of any case of these diseases are required by law to notify the health authorities of the community, in order that steps may be taken to prevent their spread.

In each case the scientific or medical name of the disease (if there is one in common use) will be given first, followed where it seems helpful by the popular name.

Amebiasis (Amebic Dysentery)

Although it is a common disease in certain tropical countries it is probable that many American doctors have never seen a case of amebiasis. Nevertheless the parasite which causes it is not infrequently found in the feces of apparently well persons in the United States if microscopic examinations are made. A few years ago there was a large outbreak of this disease in a Midwestern State, and among people who had visited there and gone home. This was found to be due to faulty water supplies in some hotels in which the drinking water had become contaminated with sewage. This illustrates how a disease which is uncommon in a place may suddenly become very prevalent if the conditions for its transmission are just right. The conditions in this case were such as permit of large numbers of the parasite getting into the food or drink.

The parasite is known as *Endamoeba histolytica* and it is a microscopic animal of the single celled or protozoan kind. Similar but harmless amebae can be found in pond water and in the healthy intestine.

The symptoms vary from mild digestive disturbances to severe and even fatal bloody diarrheas. Sometimes they may resemble acute appendicitis so much that patients have even been operated on. Sometimes abscesses form in the liver.

With pure water supplies and good sewage disposal, there is not much danger of large outbreaks. Occasional cases may occur, however, even where these facilities exist. Even small amounts of feces from an infected person, carried to the mouth of a healthy one, may spread the disease; thus it may be carried through the handling of food with unwashed hands, or by flies which may visit the privy vault and later the kitchen.

The incubation period is very variable, from 2 days to several months, depending largely on the amount of the infecting dose.

This disease offers strong arguments for (1) personal cleanliness, especially hand washing after defecation and before

handling food, since many persons without knowing it may be carriers of the parasite; (2) maintaining an efficient health office which will insure a good water supply and sewage disposal system, and will inspect the piping in establishments to be sure there are no leaks or connections through which the water could become contaminated; (3) preventing fly breeding, and if privies are used, seeing that they are of modern flyproof construction.

The treatment of amebic dysentery is usually long drawn out before complete cure is effected. There are some drugs which attack the ameba but they are powerful substances and can be given only under the direction and observation of a physician.

Ancylostomiasis (Hookworm Disease)

Some diseases are rather sharply confined to certain parts of the country. Hookworm disease thrives best in those parts which have mild winters and a moist sandy soil, because the parasite can develop better and live longer under those conditions. Consequently, the Southern Coastal Plain is most heavily infested, although the disease is by no means confined to that area. In some warm countries where a large part of the population is poor and ignorant, four out of five persons may be infested. Poverty contributes to the prevalence of hookworm disease because the people are unable to provide themselves with proper sewage disposal, and because they cannot even afford to wear shoes. The great source of danger is infested soil, and shoes give considerable protection against the larvae of the parasite which live there. If human feces were properly disposed of the soil would not become infested.

The adult parasite can be readily seen since it is about half an inch long. This animal attaches itself to the wall of the small intestine by means of the "hooks" in its mouth (or in one species by suckers) and the amount of damage it does depends upon its numbers in a given case. If there are but few parasites present, probably no symptoms will be noticed, but if there are hundreds the patient will be much disabled.

If the patient is a child, he will fail to grow and may remain permanently stunted. He will have very little strength or ambition and may get an undeserved reputation for laziness. His blood becomes thin (anemia), his skin has a dirty yellow color, and his belly protrudes like that of an aged feeble man.

There is one good feature of the disease—the worms do not multiply in the body. Although they may live for several years, they eventually die off, or may be readily killed by medical treatment. Unless the patient acquires more worms he is permanently cured. But there is constant danger that he will get more if he continues to live as he did.

The life history of this worm is very interesting and parts of it would seem almost incredible if it had not been repeatedly confirmed. The female worms in the intestine of an infested person lay enormous numbers of eggs. These pass out of the body in the feces and get on to the ground. In warm, moist sandy soil they soon hatch into larvae. When a barefooted person comes along they attach themselves to his feet, and bore through the skin causing sores which are known as "ground itch." Under the skin they get into the blood and are carried to the heart and then to the lungs. In the lungs they bore through the membrane and get into the bronchial tubes and are coughed up into the throat. If they were spit out then the person would not become infested, but many of them are swallowed and go down through the stomach to the small intestine which is their natural final home. Here, as adults, they attach themselves and the circle starts over again.

It is easy to find out if a person has hookworms by microscopic examination of the feces, for the eggs have quite a characteristic appearance.

In the United States the prevalent hookworm parasite is *Necator americanus*, but other similar forms are recognized.

This disease teaches several lessons in public health: (1) That we must have accurate knowledge of the cause of a disease before we can intelligently combat it. People have undoubtedly had hookworm disease for thousands of years, but only within the last century has the cause been known,

and sufficient knowledge for practical control has been gained only during the last generation. (2) It shows how climate may affect the prevalence of disease. Hard frosts kill off the parasites in the ground and leave it clean at least once a year. (3) It shows a direct relation between poverty and disease. Moreover, since poverty and ignorance encourage each other it gives us a chance to help through education.

In the areas where the climate and soil conditions favor hookworm disease, the measures which have been found effectual in controlling it are principally: (1) Examining a large sample of the population to find out how prevalent it is. (2) Treating all infested persons who can be persuaded to come to clinics. This immediately lessens the amount of ground pollution. (3) Persuading and helping the people to build sanitary privies and use them so that the surrounding soil will not become contaminated. (4) Teaching the school children how hookworms live and cause the damage. The children carry this information home and tell their parents. (5) Encouraging the wearing of shoes. Many people who can afford them prefer to go barefoot in the summer.

Treatment of hookworm disease is a matter for a physician to direct and observe. There are several drugs which attack and kill the worms in the intestine, but they are not safe to be taken without medical supervision. While a cure is possible in nearly all cases, in the sense that the worms can be gotten rid of, it cannot be expected that all of the damage which has been done in severe and long-standing cases can be repaired. Fortunately, such cases are now rare since the extensive campaigns against hookworm have very much reduced the degree of infestation.

Bacillary Dysentery

By dysentery we mean in ordinary speech a condition in which the patient is sick with very frequent bowel movements consisting largely of mucus in which there is more or less fresh blood and which are accompanied by pain and straining.

But medical science has shown that we must discriminate between the different causes of this condition. We have already seen that an animal parasite (see Amebic Dysentery) causes one form of the disease.

The present form, however, is caused by an entirely different class of living things, certain kinds of bacteria, which are microscopic plants. A number of closely related organisms may cause the disease, but they all belong to the genus *Shigella*. They are contained in the feces of persons sick with the disease and are carried to well persons by various routes, such as soiled articles, food, milk, drinking water, and flies.

The chief differences which this bacillary dysentery shows when compared with the amebic form are: (1) It is rapidly spread in places where there are close contacts, such as camps or schools. The sick person is dangerous from the beginning of fever until the stools no longer contain the bacilli, which may be up to 4 weeks. (2) The incubation period is very short, from 2 days to a week. This is due to the very rapid multiplication of bacteria, and their production of poisons. In amebic dysentery the incubation period may be short if the dosage has been large, but ordinarily it is a matter of 3 to 4 weeks. (3) It particularly attacks babies, children, and young people rather than adults. This disease does not confer a strong lasting immunity as some of the communicable diseases do, so that people may have repeated attacks.

Control and prevention are much the same as in the case of amebic dysentery, described above, but it is very important in the bacillary form to isolate the patient so that the discharges from the body may be thoroughly disinfected before they are removed from the room. Nurses and attendants must be careful not to carry any of the discharges on their hands and clothing, and the room should be cleaned with soap and water after the patient leaves it.

The diagnosis is confirmed by bacteriological examination of the feces. Such examination should be continued by the health department during convalescence in order to determine when it is safe to allow the patient to resume his activities.

With a safe water supply, the use of pasteurized milk, and protection from flies there is not much danger of epidemics of this disease, but occasional cases and small outbreaks may result from hand to mouth transfer of the bacilli, or the infection of foods by a cook who harbors the bacteria. It is therefore important that all cases of illness with symptoms which suggest this disease should be reported and investigated.

Botulism

Botulism is not strictly a communicable disease, since there is no danger of contracting it from a patient. Since it illustrates a form of food poisoning which may attack many persons at the same time and offers some important health lessons, it is included in this book. It is due to a bacterium, *Bacillus* (or *Clostridium*) *botulinus*, but only indirectly. Probably many people swallow this bacillus during their lifetimes without any bad effects, since it is widely distributed in nature and could readily get into food. It is only when the food is of such kind and is kept in a certain way and for a sufficient time before it is eaten, so that the bacillus can multiply and produce a poison or toxin, that this disease is produced.

Bacillus botulinus is one of the group known as anaerobic, that is, it grows best under conditions where most of the air is shut off. In the process of its growth it produces a most powerful poison which remains in the food probably permanently. Formerly this disease was caused principally by eating commercially canned foods which had been imperfectly processed. The heat used was insufficient to kill all the bacteria; and since most of the air was driven off, the remaining botulinus germs could readily produce their poison. In this process gas was produced and the cans were sometimes bulged at the ends from the inside pressure. The canning industry, however, has largely overcome this danger. The more recent instances have been due to home-canned articles. Sausages have sometimes caused botulism, which in fact gets its name from the Latin name for sausage.

Although botulism is rather rare, outbreaks always attract much attention on account of their dramatic suddenness and high death rates. A whole family may be wiped out in a few days, or many persons who have attended a function where the poisoned food was served may be attacked and most of them may die.

The prevention of botulism depends on an understanding of the cause. Government inspection and control of commercial canning and processing, together with the efforts of the industry, have largely eliminated this particular source of danger. Home canning, however, is often undertaken by persons who have no knowledge of the danger and do not employ correct methods. This can be overcome by education, but there will doubtless be more outbreaks in the meantime. Fortunately, there are some general rules which will give reasonable protection to consumers: (1) One should never serve food taken from a can which was bulged at the ends, nor preserved food which has a disagreeable and unnatural odor. (2) Foods which have been kept over for future use should be thoroughly heated before such use. Fortunately, heating to a boiling temperature destroys the toxin if it is present.

Botulism shows itself by irregular and inconstant abdominal symptoms, great weakness and particularly by signs of nervous system involvement including paralysis of the eye muscles and sometimes those of the throat. These signs come on usually within 24 hours after the food is taken. Serums have been prepared which are effectual in treatment if given sufficiently early, or in prevention in persons who have eaten the poisoned food but have not yet shown symptoms.

Brucellosis (Undulant Fever)

Although this is an important disease about which everyone should have some information, it has no common name which is generally understood. One form of the disease was prevalent years ago in some of the Mediterranean Islands and was given the name of Malta fever. The name Undulant fever indicates

that the fever is not constant but comes on in waves or undulations. The name Brucellosis was adopted because all forms of the disease are due to infection with one or another member of the bacterial group *Brucella*, so-called after Dr. Bruce who first found the germ.

Brucellosis is a disease usually of slow development and rather indefinite symptoms which include irregular fever, chills and sweating, and pains in the joints and muscles. There may rarely be but one attack of illness, but usually after an interval another attack comes on and this may be repeated indefinitely, resulting in long continued disability. The death rate is not very high, but the suffering and economic loss are considerable.

It might be questioned if this is a communicable disease, since it is true that the disease has very rarely been carried from one person to another. The disease is, however, constantly carried from animal to animal, and from animal to person, and is in that sense communicable. The animals which harbor this disease are chiefly domesticated goats, cattle, and hogs. Each kind of animal has a particular race of brucella which is characteristic of it, but each can occasionally suffer from one of the other kinds. People can be infected by any of the three kinds. People who drink raw infected goat milk are likely to get the goat variety or in other words the original Malta fever. Persons who drink raw infected cow's milk are exposed to the *abortus* variety. This form causes great losses in the cattle industry due to the premature birth of calves. Infection with the hog variety (*B. suis*) is uncommon in man, fortunately, since it is reputed to be more severe.

The incubation period is irregular—from 6 to 30 days or more.

There are two principal ways in which the disease is acquired:

(1) By drinking milk taken from diseased animals. This method causes about half of the cases. Pasteurizing the milk effectually prevents this danger.

(2) By intimate contact with diseased animals or their car-

casses. Farmers and veterinarians, and slaughterhouse employees and butchers are exposed to this form of infection, as are those who handle infected meat in the kitchen.

Control of this disease is primarily a problem in animal husbandry. Efforts are being made to eradicate the disease from herds of the various kinds of animals which are affected. Undoubtedly in time this will be successful, but in the meantime the danger must be recognized.

This disease is another powerful argument in favor of universal pasteurization of public milk supplies. It is practically impossible to be sure at any given time that a herd is free from the infection and that all of the milk from the herd is free from the bacillus. The other method of infection is less easy to prevent, and is essentially a matter of industrial hygiene. Still, if the persons who are exposed by reason of their occupation are fully informed of the dangers, some precautions will occur to them against unnecessary exposures.

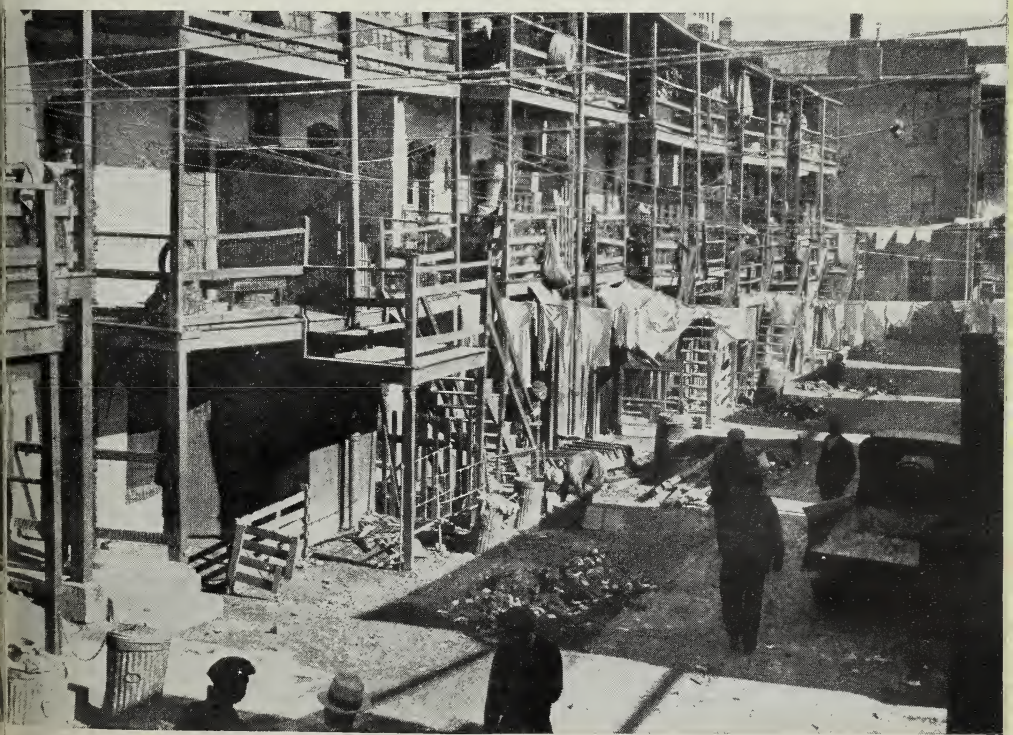
Cases of this disease should be reported to the health department so that steps may be taken to find the source of infection and prevent further infections. The diagnosis of the disease is greatly assisted by the agglutination test. This is a laboratory test in which a small amount of the patient's blood serum is added to a suspension of the bacteria in suitable proportions. If the bacteria assemble into clumps, brucellosis is assumed to be present and the test is said to be positive. The test may be used also on animals to detect the infected animals in a herd.

At the present time there is no specific treatment for brucellosis. A new class of drugs has recently been introduced which is remarkably effective against some forms of bacterial infections. This leads to the hope that these or some modifications of them may prove useful against this disease. Except for the small proportion of persons who die in the acute stages of the disease, in most cases it tends to recovery without special treatment, but unfortunately this may sometimes occur only after months or even years.

S. A.—Lee

OVERTY, IGNORANCE, CARELESSNESS BREED DISEASE

ums do not stop at the city limits. ven in rural areas of this country ss than 1 farm in 20 has the basic nitary conveniences commonly nsidered part of the "American andard of Living." Five million Americans are disabled by illness on an average day. Since most of these are of that third of our population which is ill-housed and ill-fed, decent living conditions are obviously powerful weapons against disease.



A.—Mydans

F. S. A.—

Foolish sentimentality as well as helpless poverty too often brings children into the sick room. Even a mild adult infection may prove fatal to a child. This is the most comm way for tuberculosis to pass from o generation to the next. Strict i lation will aid in breaking the cha

F. S. A.—

Since the popularity of milk as a beverage is exceeded only by its popularity as a breeding place for bacteria, the importance of protecting it every step of the way, from cow to consumer, cannot be overstressed. Every year outbreaks of typhoid fever, scarlet fever and septic sore throat are definitely traced to contaminated milk supplies.

F. S. A —Lee

S. A.—Lee

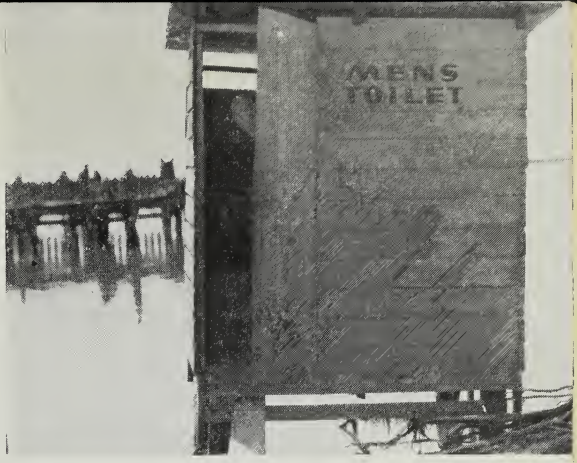
Equally guilty as a source of disease is the dirty kitchen where carelessness in the handling of food and utensils often causes not only whole families but whole neighborhoods to suffer from food poisoning.

It has been conservatively estimated that flies, dirty milk, and careless preparation of food account for the death of more than 13,000 young children and infants every year. Because of its partiality for both the food and feces of man, the fly is particularly dangerous.

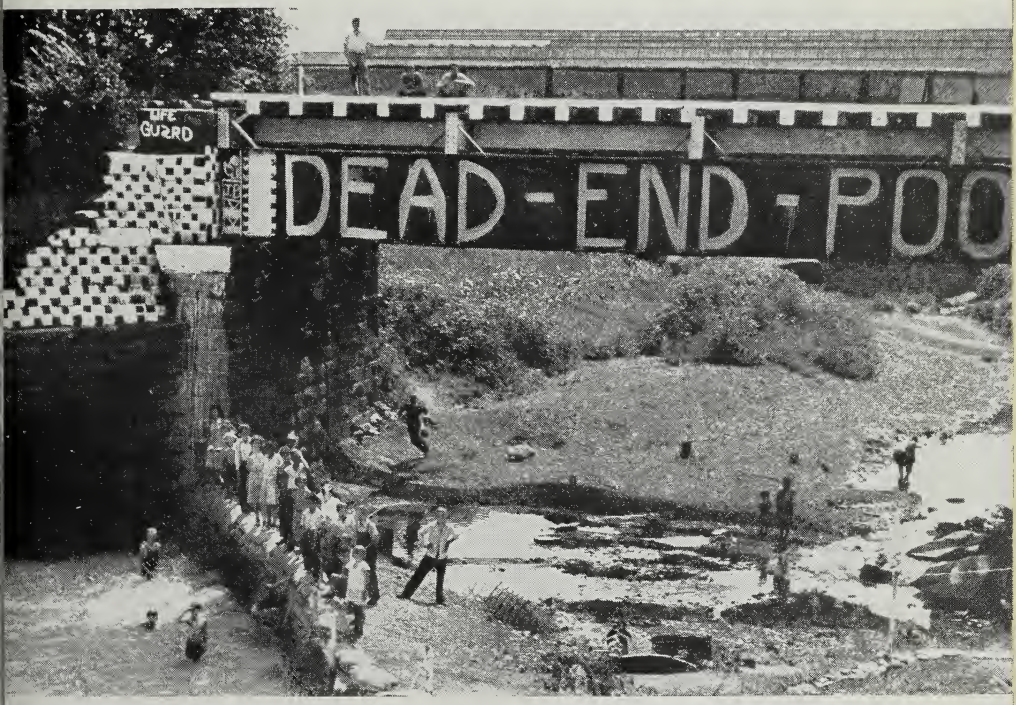
F. S. A.—L

A double hazard to health is the only too common primitive slaughter-house. Inexperienced or careless butchering may permit diseased meat to be locally distributed while the neighborhood water supply may be polluted by dangerous open refuse drains and ditches.

ne of the common sources cf phoid, dysentery, and other testinal disorders is polluted ater. Yet many a thoughtless selfish citizen seems to consider e public water supply as the ghtful outlet for the sewage frcm s home or place of business.



F. S. A.—Rothstein



F. A.—Rothstein

P. A.

With today's children learning to swim almost as soon as they learn to walk; with the unprecedented popularity of all forms of water sports; with the rapid increase of urban populations and the widespread use of surface water for drinking purposes, stream pollution is a major health problem.

F. S. A.—La

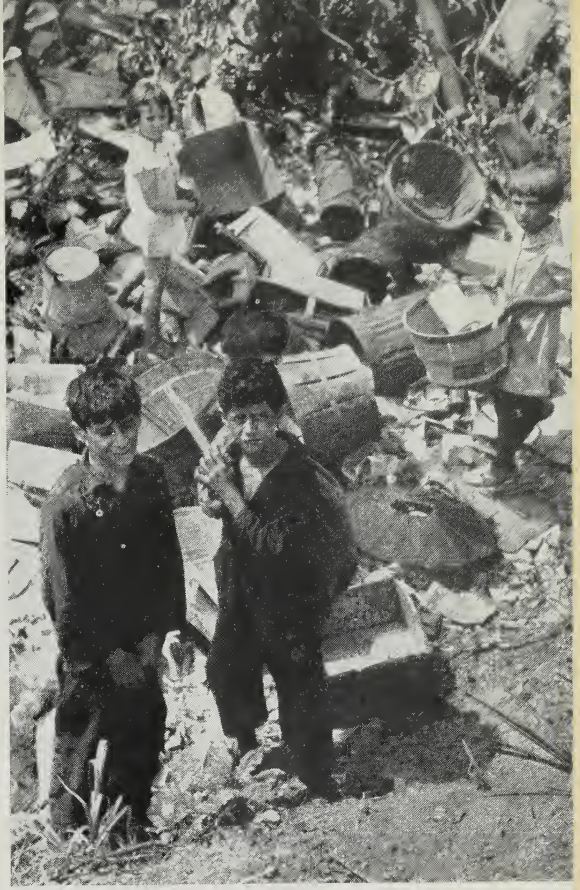
In the warm, humid Southern States many people habitually go barefooted. The soil being contaminated because proper sewage disposal facilities are lacking, hookworm is a widespread infestation. It causes an anemia which stunts the growth of children and saps the vitality of adults. Here both ignorance and poverty are found working together to bring about a staggering economic loss to the South.

Ownerless vagrant dogs a chiefly responsible for the pe ennial scourge of rabies in t United States. Running packs, they are usually mo than willing to fight all come In England an aroused publ opinion brought about strict d control laws and rabies h been completely wiped out.

F. S. A.—Rothst

ity dumps, notorious havens for
ats, hold a great attraction for
dventurous and rummaging chil-
ren who little realize what a
enace the rat is to man. Rats
ay be carriers of rat bite fever,
fectious jaundice, and of intes-
nal parasites. They will con-
nue to "plague" man just as long
s man continues to provide them
ith food and shelter in refuse-
lled alleyways and dumps.

pidermophytosis or "athlete's
oot" is the most prevalent of all
kin diseases. Being a fungus
nfection, it thrives in warm
ampness such as is found on
hower and locker room floors,
nd quickly spreads from one
athlete" to another.



F. S. A.—Rothstein

F. S. A.—Ev

That the South loses one third of its efficiency to malaria each year is a matter of sober fact based on sound and conservative figures. Malaria victims very often become infected as children and remain chronically ill, with sapped vitality. It is n uncommon for entire neighborhoo to be stricken at one time so th businesses are forced to shut dow or valuable crops, such as the or below, allowed to rot, unpicked.

F. S. A.—Rothst

Chancroid

Chancroid is a local disease of the external generative organs in which a sore or ulcer develops. The cause of this sore is believed to be an infection with a germ known as the Ducrey bacillus, although some physicians question the part which this germ plays. This disease is ordinarily of relatively little importance in itself but may frequently complicate the early stage of syphilis. For this reason any person who has a sore on the generative organs should consult a physician immediately and remain under observation until the sore is healed and he is assured that syphilis does not exist.

Cholera

The cholera which this article deals with is not the "cholera morbus" or infantile cholera with which American families are familiar as acute diarrheal attacks in young children. It is the Asiatic cholera, so called, a disease which occurs in the form of violent epidemics during which a large fraction of the population may die. Epidemics have occurred in the United States in the past and there is no natural reason why they could not occur again. The only reason why there is little danger at the present time is that we have set up artificial protections in the form of national quarantine to prevent the importation of the disease, and by the purification of public water supplies we have shut off the chief means of spread in case the disease should be accidentally introduced.

Cholera is caused by a species of bacteria belonging to the group known as *spirilla*. The individual germs are curved rods, instead of being straight rods (bacilli) or round balls (cocci). When attached together end to end they may form wavy or spiral threads. The present name for the germ is *Vibrio comma*, which is fairly descriptive since the germ is actively motile (or vibrating) and is curved like a comma.

The *Vibrio comma*, when it gets into the digestive tract of people through the mouth, sets up a most violent diarrhea and vomiting so that much of the water of the tissues is drained off

and the patient quickly collapses; and frequently death follows. These symptoms come on within from 1 to 5 days after exposure.

Infection occurs, as in so many intestinal diseases, by transfer of the germs contained in the feces and vomited matter to the mouths of well persons by various means, chiefly by the three F's, fingers, foods, and flies, and by drinking water. The first line of defense therefore must be set up at the bedside of the patient, and everything which comes from his body must be promptly disinfected. This includes all articles which may in any way have been soiled or used by the patient. In order to insure the thoroughness of this disinfection the patient must be isolated and quarantined. Nurses and attendants who enter the sick room must take extraordinary precautions.

This disease was one of the first in which "carriers" were demonstrated. That is, persons who have recovered from the disease, or who may have had a mild or unrecognized attack, may "carry" the germs in their bodies for a long time, liberating some constantly or from time to time in their excretions. These persons are obviously very dangerous to a community, since they appear well, and may not even know that they are carriers. The diagnosis of the disease or of the carrier is made by bacteriological examination of the excreta. When ships with passengers coming from infected ports and showing suspicious symptoms arrive in American harbors, the United States Public Health Service detains them in quarantine, and may conduct bacteriological examinations of everyone on board before releasing them. Some carriers discharge bacteria intermittently. A few such might possibly escape detection, and if admitted to the country might infect a few other persons, but it is unlikely, with our generally very good public water supplies, that a large epidemic could occur.

An important health lesson is to be learned from cholera. This is that a highly and efficiently organized state of society is necessary for the protection of the health of the public. It is true that by personal hygiene one can avoid a great many ills, but one cannot personally boil all his drinking water, pas-

teurize the milk which he drinks, cook and handle his food himself, combat disease-bearing insects, and do a thousand other things necessary for protection, and expect to have any time left for the ordinary affairs of life. Many of these functions are taken care of by organized society in various county, city, State, and Federal departments. The future of civilization and consequently of public health is in the hands of the youth of today.

Common Cold

No one needs to be told what is meant by the common cold or what its symptoms are for nearly everyone has had one or perhaps many attacks of this disease. It is a question whether the word "common" should be interpreted to mean "ordinary" or "universal." In the latter sense colds may be said in certain seasons and areas to be *common* property.

It is customary for people to dismiss colds lightly as being of little significance, and it is true that of themselves they are not deadly. Nevertheless, many deaths occur from diseases which appear to have their origin in common colds. This is especially true in the case of young children and old and debilitated persons. Again, in the aggregate, colds cause an enormous amount of economic loss from time out from work, so that they are by no means trivial.

Colds are now believed on some strong experimental evidence to be due to a filterable virus. This is a good place to explain what is meant by this term. It is one with which the public will become more and more familiar as time goes on.

In the preface it was stated that the communicable diseases are all due to the invasion of the body by some small forms of animal or vegetable life. The largest one spoken of in this book is the hookworm, which is about a half-inch long, and is a complex structure having internal organs composed of many different kinds of cells. Then there are microscopic single-celled animals such as the ameba of dysentery and the plasmodium of malaria. The vegetable parasites include the bacteria and moulds, and these are all microscopic and smaller

than a red blood cell. Then there are two groups of tiny organisms whose final classification has not been completely settled, the spirochetes and the Rickettsia. And finally there are the filterable viruses.

The word "filterable" strictly speaking is incorrect. What is meant is that these viruses are composed of particles so small that they will pass through filters having such fine pores that no other form of life can go through them. They are really filter *passers* and are sometimes called so. In ordinary speech if one said that something was filterable, he would mean that it could be removed from a suspension by filtering. These viruses cannot be removed in this way.

By special microscopic methods suspensions of these viruses can be shown to consist, in some cases at least, of extremely tiny particles. While they can be kept alive and apparently permitted to multiply outside of the body they cannot be made to form visible colonies as the bacteria can. The only sure test of their presence is therefore their ability to cause disease either in man or in experimental animals. Some investigators believe that they consist of single large molecules and are really the missing link between lifeless chemicals and the simplest forms of living things. Several other diseases dealt with in this book are caused by "filterable" viruses.

Colds are carried from person to person chiefly by "droplet infection." That is, in speaking, laughing, coughing and sneezing, small drops of moisture containing the virus are thrown off into the air. Being so small, they float about for a short time, long enough to reach the nose or mouth of a person standing a short distance (perhaps about 3 feet) away. The virus may also be carried by soiled hands, or handkerchiefs, and other articles.

No health department can prevent common colds. It is not easy, either, for a person to protect himself unless he stays in seclusion. It is practicable, however, for a person who has a cold to do something to protect other people. He should, in his own interest, give up his usual activities for a day or so and especially in the interest of others should avoid

gatherings of people. Paper handkerchiefs should be used to receive the discharges of the nose and mouth, and these handkerchiefs should then be burned or thrown down the toilet. The hands should be washed frequently and handshaking avoided. One should not stand close to others in conversation or talk in their faces, and in coughing, etc., the mouth and nose should have a handkerchief held in front of them to prevent the spread of droplets. It is easy to see how difficult it would be to persuade the great majority of people to take even these simple precautions. But greater miracles have occurred. A wonderful improvement has taken place within relatively few years regarding the practice of spitting on floors and sidewalks and in vehicles. Only those who have seen this improvement could believe it possible to influence the public in personal behavior in so short a time. Transferring a cold to another person is the worst of bad manners.

The symptoms of colds develop within 12 to 48 hours of exposure or perhaps a little longer. The secretions are most dangerous during the first few days of the disease, but probably do not remain infectious for more than a week.

It is believed that keeping the body in the best possible condition by personal hygiene in matters of rest, outdoor exercise, fresh air at all times, proper diet, keeping the bowels regular, and wearing proper clothing, confers a certain degree of resistance against colds. Certainly it is the only proper way to live.

Numerous nostrums are sold for colds. For few products are the advertising claims more flamboyant and misleading. Some of them may relieve symptoms or make the patient think he feels better. There is no evidence that any will prevent disease or hasten cure. Most of them are merely a waste of money. To the extent that they reassure the patient and delay his seeking of competent medical treatment in serious cases, they cause positive harm. For a severe cold go to bed and call a doctor.

Dengue

Dengue (pronounced in two syllables) is also known as breakbone fever, on account of the very severe pains in the limbs. Fortunately, there is no danger of the bones breaking, and in fact, death rarely, if ever, occurs as a result of dengue, but the suffering may be extreme for a few days. The other principal symptoms are fever, which usually comes on in two spells with an interval between, and often a skin rash.

Dengue frequently occurs in the form of extensive epidemics during which a large part of the population may be attacked. These only occur in parts of the country where a particular mosquito (*Aëdes aegypti*, the same one which transmits yellow fever) abounds in sufficient numbers, and this means the warmer parts of the country and during the warm season. The Southern States are therefore the ones chiefly affected. More will be found concerning this mosquito in the article on yellow fever.

The cause of the disease is a filterable virus. (See Common Cold.) The virus exists in the blood of the patient for at least a day before he becomes ill. If one of these mosquitoes bites the person at any time from this time until the fifth day of illness, the mosquito may then become infected with the virus. It is not known that this does any harm to the mosquito. It is a curious fact, however, that the mosquito cannot immediately give the disease to a well person by biting him. A period of at least 11 days must elapse before the bites will be infective. Something happens to the virus or its location inside the mosquito during this period. After that, as long as the mosquito lives it may infect persons.

The incubation period of the disease after a person is bitten is from 3 to 10 days. After having had several attacks of dengue people have a certain amount of resistance to the disease. Consequently, adults who have lived long in the affected locality are less likely to be attacked than children or visitors from other parts of the country.

Dengue could be entirely prevented if the *Aëdes aegypti* were

wiped out. This is not at all an impossible task, as will be seen in the section on yellow fever. The only other practicable means of protection is to place screens around all patients as soon as they are recognized so that mosquitoes cannot reach them, and to have all persons protected as much as possible by house and bed screens.

Dengue is not considered a very serious disease simply because it causes hardly any deaths. It is very significant, however, when we think that the same kind of mosquito carries yellow fever, which is a deadly disease. On account of both of these diseases Southern cities should maintain constant efforts to combat the breeding of these mosquitoes.

Diphtheria

It is difficult for young people nowadays to realize how prevalent and how deadly diphtheria was just a matter of 40 years ago, in the same way as it must be hard for them to think of a time when there were no automobiles running around the streets. As diphtheria decreased, automobiles increased, but there was no causal connection between the two occurrences. Both, however, were due to the same general cause—the advance of scientific knowledge. If there had been no Watt with his steam engine, no Faraday with his electromagnetism, there would have been no gasoline engine and no modern automobiles. In the case of diphtheria, if Pasteur and Koch had not laid the groundwork of bacteriology, Klebs and Loeffler would not have discovered the diphtheria bacillus, and Behring in turn could not have devised his diphtheria antitoxin. Neither could the modern preventives, toxin-antitoxin and toxoid, have been prepared.

Human progress depends upon the preservation of a continuous chain of human effort, each link of which is the contribution of some one person.

Diphtheria is caused by *Bacillus diphtheriae* (later name, *Corynebacterium diphtheriae*) which appears when stained and under the microscope as a tiny rod which may be more or less

beaded, and clubbed on one end. It has two disease-producing peculiarities which, when it gets into the human nose or throat, cause the symptoms which we call diphtheria: (1) The inflammation which it causes in mucous membranes produces a meshwork of fibrinous threads that appears on the surface as a dirty white or grayish membrane which cannot be scraped off without causing bleeding because it extends down into the tissues. When such a membrane forms in the larynx it causes what used to be called membraneous croup and may even shut off the breathing of the patient unless one of two surgical procedures is done (intubation or tracheotomy). (2) During its growth in the membrane the bacillus produces a powerful poison or toxin, which becomes absorbed by the blood and is carried all over the body. This toxin acts on the heart and on the nerves and is the principal cause of death.

Fortunately, the bacillus can be grown outside of the body in artificial culture media of various kinds—broths and jellies—where it produces the same poison. This poison can then be separated in a relatively chemically pure condition. Fortunately, also, this poison acts on some of the lower animals as it does on man. This has enabled us to prepare antitoxin, which when administered early in the disease is an almost sure cure for diphtheria, and toxin-antitoxin and toxoid, which when given to children are almost sure preventives of diphtheria in later life.

The use of these preparations by the medical and public health professions is the cause of the remarkable reduction of the diphtheria death rate during the past 40 years. They are still not used enough. It is still difficult to persuade some parents to call a doctor when a child has a sore throat with a moderate fever. They wait a few days until the child is seriously sick. By that time the toxin has combined with the tissues and cannot be separated. Antitoxin at this time can do no more than neutralize the toxin which is still circulating in the blood. This may or may not save the life of the patient, but there are apt to be at least some heart damage and some

nerve paralysis left, even if the patient recovers. Again, it is difficult to persuade some parents to permit their young children to receive protective inoculations of toxin-antitoxin, or toxoid (which is better for infants). They hesitate either out of pure ignorance or from ungrounded fear of the injections, or because they prefer to let their children take the chance of infection, intending to have them treated properly when they get sick. Are they not the same kind of parents who would defer treatment until it is too late? Consequently, we still have a good many cases of diphtheria and still too many deaths, when it is considered that both are preventable. In some communities where a large proportion of the children have been immunized, diphtheria has practically disappeared and has caused no deaths for several years.

This topic offers a good place for some remarks on immunity. Immunity means resistance to communicable disease. Man is naturally immune to some diseases which affect some lower animals, and some lower animals are immune to some diseases which affect mankind. This apparently depends upon some differences in the chemical make-up of the species. Again, some individuals appear to have greater resistance to certain diseases than others have. We can seldom be sure whether they were born that way, or whether some chance exposure has immunized them. This brings us to a consideration of "acquired" immunity. This may be of two kinds—active and passive. Active immunity is that variety in which the body by its own internal activities has protected itself. Examples are: (1) An adult who has lived all his life in a crowded city, meeting many people daily, and has received many small doses of diphtheria bacilli, no one of which was sufficient to cause the disease. The tissues of this person, however, have reacted to the stimulus of these doses, or rather to that of the toxin which they produced, by producing chemical antidotes known as antibodies (because they are "anti" or against the toxin) which stand ready to combat any new dosage which the patient may receive. (2) An infant injected with several doses of toxoid (a sort of detoxified toxin which can still call

forth the production of antibodies) produces its own immunity in the same way. (3) A person who has had diphtheria and has recovered from it is usually immune for a long time but may have subsequent attacks. Although the immunity is "active," for some reason it appears not to be so permanent as that produced by the other two means. Active immunity in general is long-lasting and frequently permanent for the duration of life. When artificial it is used for prevention. It usually takes weeks to develop in significant strength.

Passive immunity is the kind in which some other person or animal has produced the antibodies, which have then been introduced into the body of the individual and which protect him as long as they remain in sufficient concentration. Examples are: (1) A new-born child which, if its mother had circulating antibodies, has received them through the placental circulation. As long as they remain the child is immune, but they usually disappear after a few weeks or months. (2) A child who has been given antitoxin on the first day of a diphtheria attack. The antitoxin antibodies were made in the body of a horse which had received many increasing doses of diphtheria toxin. The horse therefore had active immunity. When the horse serum containing the antibodies is injected into the child, the child acquires a temporary passive immunity, which lasts long enough to prevent further progress of the attack. Passive immunity is therefore usually only temporary, and when artificially caused is for the purpose of treatment of present disease rather than prevention of future illness, since, although it acts immediately, it does not protect for long.

Diphtheria is a condition in which "carriers" play an important part (see chapter on cholera). People may be immune to the toxin of diphtheria at the same time that the bacilli may live in their throats and noses. They are thus a danger to other people while in no danger themselves. Convalescents may be carriers, and so may persons who have had no attacks of diphtheria or such mild ones that they were not recognized. It is very important for health departments to know about these carriers and that is one reason why every case of diph-

theria should be reported. Cultures can be taken from the nose and throat of persons recovering from diphtheria and the time of disappearance of the bacilli determined. Previous to that time the individual should be isolated from contact with well persons who are not immune. Sometimes the carrier state lasts a long time. Tests may then be made to see if the bacilli are still virulent, that is, capable of causing the disease. This cannot be told by simple microscopic examination. If the bacilli are found to be no longer virulent, the patient may be released. Otherwise various forms of treatment may be employed to rid the carrier, if possible, of his bacteria.

Whether a person is immune to diphtheria or not may be determined by the Schick test. This consists of injecting a minute measured amount of toxin into (not beneath) the skin, usually of the forearm. If the person is immune no reaction occurs, but if not immune a red spot develops at the place of injection. This test was formerly employed routinely on all children before giving them toxin-antitoxin or toxoid, but because of the time taken (several days) and the extra handling of the children, who were hard enough to get together for the injections, and the fact that nearly all babies and young children are not immune, many health officials omit the procedure now. If a few children get the preventive injections unnecessarily, it is argued, no harm is done. Schick tests should be made some months after the preventive inoculations in order to find out whether they have been effective, since some persons are harder to immunize than others and require more injections than are routinely given.

Diphtheria begins to show symptoms in from 2 to 5 days after exposure. It may be conveyed to another person as long as the bacilli, in virulent form, remain in the patient or carrier, and this may be weeks or even months.

The public health control of diphtheria depends upon: (1) Prompt reporting of cases; (2) their isolation and quarantine until officially released; (3) offering bacteriological laboratory assistance to doctors for the diagnosis of the disease (although the good doctor will not wait for bacteriological tests before

giving antitoxin in suspicious cases, they will guide him in subsequent treatment); (4) controlling the carriers discovered by bacteriological examinations; (5) making antitoxin available to everybody, and free to the poor; (6) seeing that all children so far as possible are immunized by toxin-antitoxin or toxoid in the first year of life, preferably at 6 months, a service which should be performed either by the family doctor or by the health department; (7) disinfection of all discharges from the patient and all articles used by him; thorough cleaning of the sick room after the patient leaves it; (8) since diphtheria is occasionally carried in milk where a case or a carrier has been employed in its preparation, the use of only pasteurized milk should be encouraged.

The treatment of diphtheria is a matter for a doctor, and home remedies do no good and waste valuable time. Unless a child is known to be immune to diphtheria (negative Schick test) a doctor should be called promptly when there are symptoms of sore throat with mild fever, or even of indefinite illness where the cause is not apparent. He will administer the serum if in his judgment it is needed. In neglected cases, in addition, he will remove the membrane by suction or perform intubation or tracheotomy, if they are needed to save life.

Diphtheria is usually contracted by contact with the sick person or carrier, by droplet infection, or by handling recently soiled articles. Sometimes, as said above, it is conveyed in milk, and in this case extensive epidemics may be caused which are almost explosive in their suddenness.

Encephalitis, Infectious (Sleeping Sickness)

Encephalitis is a term which covers a number of closely related diseases. The common basis of them all is an inflammation of the brain. As the word "infectious" in our title indicates, we will discuss here only those forms which are believed to be communicable. There may be many other forms of inflammation of the brain, such, for example, as might result from injury, or extend from the internal parts of the ear when

they are diseased, but they are not communicable in the sense in which that word is used here. By "encephalon" we mean the brain, and the suffix "itis" always means inflammation.

We must clearly distinguish between inflammation of the brain itself, and inflammation of the coverings of the brain—the membranes which are known as the meninges. Communicable meningitis will be discussed in its proper place.

Encephalitis (infectious) occurs either in single cases scattered about here and there, or in epidemics which may reach considerable proportions. These outbreaks usually differ from one another with regard to the symptoms, the age group of the people principally attacked, the period of the year at which they occur, or in some other way. This leads us to believe that there may be a number of similar but not identical viruses which produce these outbreaks, but all forms are believed to be caused by filterable viruses. (See Common Cold.)

Since the brain is involved we would expect the symptoms to be of a mental and nervous nature. So in various outbreaks there have been such symptoms as sleepiness (one form was called the Sleeping sickness, but this is not to be confused with African Sleeping sickness, which is caused by trypanosomes), or sleeplessness, restlessness, twitchings of muscles, paralysis of muscles, notably of the eye, mental confusion, changes of behavior and of the facial expression, etc.

The incubation period varies from 4 to 21 days, and it is unknown just how long a patient may be dangerous to other people, but the usual period for isolation is 1 week from the beginning of symptoms. The disease is carried in the secretions of the nose and throat by any means which can transfer it to the same parts in healthy persons: contact, droplets, soiled articles, etc. It has been difficult in many cases to trace any connection between the sick person and anyone else from whom he could have received the infection. It is assumed therefore that there must be considerable numbers of healthy "carriers" going about during an epidemic. (See Diphtheria.)

It has recently been shown that people can be attacked by a form of encephalitis from which horses are the chief sufferers.

Mosquito transmission has been suspected but not yet confirmed.

Food Infections and Food Poisonings

We have already discussed one form of food poisoning and pointed out that it was not, strictly speaking, a communicable disease. (See Botulism.) Some of the instances to be presently described are very evidently not those of communicable disease, while others certainly border on it, and it would perhaps take a lawyer rather than a doctor to decide how to classify them. At any rate, they are important to know about, since they occur rather frequently and sometimes affect a large number of people at the same time, especially where at gatherings of people many have eaten the same food.

We can dismiss at once those instances in which metallic or chemical poisons have accidentally or as the result of evil intent gotten into food and produced symptoms or death when the food was eaten. But with the bacterial poisoning the question is not so simple. Suppose that a cook is a paratyphoid carrier and she prepares a food which she accidentally contaminates with some of the bacteria. The food is then allowed to stand in a warm place long enough for the bacteria to multiply in it so that all parts are full of them. Persons who eat the food will then become infected and will develop the disease. If one of them happened to be a cook and contaminated some more food in the same way, and this was eaten and caused illness, we would seem to have an instance of a communicable disease. The only reason for not classifying it as such would be the rarity with which such a series of events would occur.

There are other cases of bacterial food poisoning in which the animal from which the food was prepared suffered from some disease. Then when the food made from the flesh of the animal is not cooked sufficiently to destroy the bacteria, people who eat it suffer from food poisoning. This would be an example of a disease which is communicable from animals to man, but not from man to man.

In nearly all cases of bacterial food poisoning the food is of a kind which requires little or no cooking, or which if it has been cooked, has been contaminated afterwards and then kept under conditions favoring the growth of bacteria.

The particular bacteria which have caused food poisoning have been of various kinds too numerous to discuss here. All of them (except the one causing botulism) are readily killed in a few minutes at boiling temperature.

The symptoms usually come on within from 1 to 24 hours after eating the food, and consist of various combinations of digestive tract disturbances, such as vomiting, diarrhea and pain in the abdomen, and headache, weakness, and sometimes fever. Recovery is the rule, and occurs after the responsible substance has been cleared out of the body. To aid this some form of laxative is usually given.

Cases of this kind should be reported to the health office so that an investigation can be made leading to the prevention of further infections. The accurate diagnosis can usually be made only after bacteriological examination of the suspected foods, and of the discharges of patients and persons concerned with the preparation of the food.

Gonorrhea

Gonorrhea is a dangerous communicable disease caused by a germ which is known as the gonococcus. This organism can be seen only through the microscope. It is extremely delicate and lives only under the most favorable conditions of warmth and moisture. For this reason it usually attacks the genito-urinary mucous membranes of the body. When this germ penetrates the surface of these membranes, it multiplies and the older organisms die. These dead organisms liberate a toxin or poison which is extremely irritating to the tissues of the body and causes a local inflammation.

Gonorrhea is a separate and distinct disease entity and is not the forerunner of syphilis. Both of these diseases may, however, be present at the same time.

Gonorrhea differs in the two sexes because of anatomical differences in the structure of the generative organs. In the male the first symptom of gonorrhea is an inflammation of the urethra which is accompanied by a sensation of burning and itching at the mouth of the tube which leads from the bladder to the outside. This inflammation is accompanied by the formation of pus, and considerable pain may be experienced on urination. Such symptoms occur usually 3 to 5 days after exposure. In this early stage of the disease, the inflammation is confined to the outer end of the urethra and is known as anterior urethritis. Anyone experiencing such symptoms should consult a good doctor immediately. Failure to do so may lead to extension of the inflammation to other parts of the generative organs. One of the first parts involved in such extension is that portion of the urethra nearest the bladder. When this occurs, urination becomes more difficult and painful and the inflammation is likely to involve the prostate gland and the seminal vesicles. Still further extension may produce inflammation of the testicles. Such involvement may cause sterility or the inability to produce offspring.

In the female, the urethra also is a common site for infection. The mouth of the uterus or womb, however, is most frequently involved. The symptoms of acute gonorrhea in the female are vaginal discharge, pain on walking, and painful urination, although in some cases there may be only a vaginal discharge without pain. A woman may have acute or chronic gonococcal infection and be unware that she has the disease. If proper treatment is not instituted during the early stages, the inflammation may extend internally to the lining membrane of the uterus, or womb. Further internal extension results in inflammation of the Fallopian tubes through which the ova pass from the ovaries to the uterus. One or both of these tubes may become closed at either end, and if this occurs they become markedly swollen and filled with pus. Such a complication is known as salpingitis or a "pus tube." A tube filled with pus may rupture and permit the organisms to enter the lower part of the abdominal cavity which results in a very

severe inflammation known as peritonitis and causes the individual to become seriously ill. The inflammation may extend to the external generative organs and produce abscesses in the neighboring glands.

In both men and women the gonorrheal process may extend to other parts of the body. The most frequent site of these complications is in the joints, which become red, swollen, painful, and tender. The gonorrheal infection may extend to the rectum and cause inflammation of this portion of the intestinal tract. This complication occurs more frequently in females and is accompanied by pain and unusual straining when going to stool. In rare instances gonorrhea may also cause serious heart disease. When gonorrhea does involve the heart, the germs grow on the mucous surfaces of the tiny heart valves and produce changes which usually cause death.

If not properly treated during the early stages, gonorrhea becomes chronic. When this occurs in the male, the small glands along the urethra become infected. The germs continue to grow in these infected glands and frequently find their way to the urethral canal. Individuals with this type of gonorrhea often awake in the morning with a drop of pus at the end of the urethra. This form of gonococcal infection is just as contagious as the more painful, acute type. The constant inflammation of the urethral canal produced by chronic gonorrhea often leads to the formation of scar tissue. Such scar tissue is known as a stricture and interferes with the passage of the urine. The prostate gland and seminal vesicles may also remain inflamed over a long period of time. They are then swollen and somewhat tender, and there is a sense of soreness and heaviness in the lower part of the pelvis.

In the female, the symptom of chronic gonorrhea most often encountered is a scant whitish discharge from the inflamed mouth of the uterus. Such a condition may not be painful, but this discharge is just as contagious as the discharge in acute cases of gonorrhea. The chief crippling manifestations in the female result when the Fallopian tubes become involved. The symptoms of extension to these structures are pain in the

lower abdomen or pelvis, undernourishment, and a feeling of general debility. Such a condition may necessitate a surgical operation to remove the infected tube.

Gonorrhea is probably the most frequent cause of sterility in both sexes. In men, involvement of the testicles, seminal vesicles, and prostate gland often leads to complications which kill the sperm cells. In the female, involvement of the Fallopian tubes may make it impossible for the ova to reach the uterus, or, if the tubes are not diseased, a chronic inflammation of the membrane lining the uterus may make it impossible for the fertilized ovum to find a proper site for development.

Gonococcal infection of the eye is a very serious complication. The germ may find its way to the eye by means of either soiled hands or soiled linen. In babies, the contagious discharge from the mother with gonorrhea may infect the eyes of the child in the process of birth. When the gonococcus reaches the eye, it sets up a very intense inflammation causing the formation of a great amount of pus. A portion of the delicate tissues forming the front part of the eye is destroyed and ulcers develop. These ulcers in healing leave large scars which destroy the transparency of the tissue of the front of the eyeball so that the individual is made partially or totally blind.

In little boys, the symptoms of gonorrhea are usually the same as in the adult male, except that the infection tends to be less severe. In little girls, the external generative organs are inflamed and the vagina or sheath which leads from the external organ to the uterus is also involved. The inflammation may be very severe. The parts become swollen, and a great amount of pus is formed. Fortunately, in the very young girl gonorrhea does not often extend to the adjacent generative organs. Although it may be of long duration and difficult to cure, it usually leaves the patient with no permanent damage.

The diagnosis of gonorrhea is based upon the symptoms above described, and the demonstration of the germ in the lesions or discharges. The disease is transmitted by direct personal contact with infected persons and indirectly by contact with articles freshly soiled with the discharges of such

persons. In adults, transmission is practically always by sexual intercourse. In children, and especially little girls, transmission frequently occurs through the use of soiled linen and toilet seats. The disease is communicable as long as the gonococcus persists in any of the discharges whether the infection be an old or recent one.

Anyone may contract the disease. The vaginal tract in young girls and the conjunctiva in the newborn are especially vulnerable. One attack and recovery does not protect against subsequent infection. The disease is widespread in both sexes and at all ages. Among men it occurs most frequently between the ages of 18 and 40 years, and among women at a little earlier age. Methods of control consist in: (1) Avoiding exposure; (2) going to a good doctor immediately as soon as any symptoms develop and remaining under treatment until cured; (3) avoiding sexual relations during the period of communicability; (4) investigating the source of infection in each case and bringing contacts to examination and treatment, if found infected; (5) using prophylactic silver solution in the eyes of the newborn; and (6) excluding persons in the communicable stage of the disease from occupations involving contact with children.

Impetigo Contagiosa

This is a skin disease of no very great importance except that it is apt to spread rapidly where children or young people are brought together in rather intimate contact, as in schools or other institutions. For a period of possibly weeks a good proportion of the affected population may be seen going around with ugly sores and scabs, or almost equally ugly dressings on their faces and hands. Other parts of the body may be involved, and adults as well as children are sometimes attacked.

The disease begins with red patches which soon show accumulations of clear fluid just under the epidermis. This fluid does not long remain clear but is replaced by yellow pus. The surface now dries forming dry hard scabs, from

beneath which the pus escapes. Eventually, healing occurs, and if the sores have not been scratched or roughly treated there are seldom any scars left. Healing can be hastened by suitable treatment. Treatment usually consists of applying something to soften the scabs so that they can be easily removed without causing bleeding, and then using various antiseptic lotions or ointments on the sore itself.

Impetigo is caused by a variety of bacteria, mostly of the streptococcus and staphylococcus groups. At least these are what are found on bacteriological examination. However, since there are plenty of these organisms in Nature all the time, while impetigo occurs only now and then, we may well suspect that some other virus is at the bottom of the trouble, and that the cocci only act as secondary invaders of the weakened tissues. This, however, has not yet been proved.

The fluids, serum and pus which escape from the sores of impetigo form a very annoying feature of the disease. They soil handkerchiefs and clothing and pillow cases and sheets, and worse than that, they cause new sores on fresh parts of the body with which they come in contact. It is easy to understand, then, why the disease spreads so quickly to other persons, and why it is necessary to isolate the first cases which appear and take every precaution to prevent their contact with others and the distribution of articles which have been soiled by them.

The disease usually appears within a few days (about 2 to 5) after exposure. Health departments seldom require the reporting of impetigo, chiefly because the disease does not cause death, and also because attention to this disease might divert activities away from far more important matters. The control therefore usually depends on the vigilance of the school or institution authorities, and on the heads of families, under the direction of school physicians or family doctors. The principles of control are: Strict bodily cleanliness, isolation during the "wet" stages, destruction of soiled dressings, and boiling or otherwise disinfecting more valuable articles used by the patient.

This is another disease in which excellent general health appears to prevent attacks, or hasten recovery, and is only one of a thousand arguments in favor of always keeping in the "pink of condition" by proper hygienic living.

Influenza

Before discussing the details of influenza (or the "flu"), there now seems to be a favorable opportunity for setting up a historical background. Influenza is the only remaining major epidemic disease which has not been virtually conquered by science. By a major epidemic disease we mean one which may attack a very large proportion of the population at practically the same time, and kill off as many as 10 percent of all the people in a community. Major epidemics, in other words, are literally "decimating." A battle is considered of great severity when it is "decimating," that is, when 1 out of 10 persons engaged is killed.

Fortunately, the epidemic diseases which may at times have such high death rates are few in number, and, as stated, all of them but influenza have been brought under virtual control. They are: Bubonic plague, typhus fever, cholera, and yellow fever. In the United States we no longer need fear severe epidemics of these diseases although we have had them in the past and there has been no change in natural conditions to prevent their repetition. The only change has been in increased knowledge which has enabled us to set up artificial safeguards. In the case of influenza, in spite of a great deal of study, insufficient knowledge has as yet been gained to enable us to prevent epidemics.

It will be noted that the statements made above refer only to epidemic diseases. There are some endemic diseases which may attack and kill as many persons as epidemics do, but they attract less attention because, since we always have them with us, we fall into the habit of taking them as a matter of course. The health official, however, does not view them in that light, and nowadays far more of his time is occupied in fighting endemic than epidemic diseases. As examples we

may cite malaria (in certain localities) and tuberculosis.

Influenza is commonly confused in people's minds with the common cold. Indeed, in some individual cases the best doctor can be excused for being unable to tell which disease it is, for they have many points of similarity. Influenza, however, is typically a more severe infection. The fever (which may be absent in colds) is usually higher and lasts longer, and there is a marked feeling of weakness and prostration, and there are apt to be pains in the back and limbs. Bronchitis and pneumonia frequently complicate the disease, and the death rate in some epidemics has been very high among those attacked.

Unfortunately, there is no ready test by which influenza may be recognized and diagnosed. The disease is known to be caused by a filterable virus. It is suspected that several differing strains of this virus exist, since each outbreak usually differs in some respect from its predecessors. The disease is carried in the usual way for diseases in which the nose and throat are attacked; by droplets, close contact, kissing, and freshly soiled articles.

It was said that we do not know how to prevent epidemics. This means that such knowledge is lacking for use in the practical every-day world. Absolute quarantine against infected persons and things will prevent the entry of the infection as long as it can be maintained. This was shown by a number of observations during the great epidemic of 1918–19, but it is seldom possible to carry out such an isolation of healthy people for very long.

Apparently, persons who have had an attack of influenza have some acquired immunity to reinfection, but this seems to last only a few months at most.

The general measures recommended for other respiratory tract infections should be carried out in the case of influenza. Even if they do not prevent an epidemic, they may delay its spread until better preparations can be made to take care of patients. Especially they may prevent pneumonia and other deadly complications.

In dormitories, the beds should be placed farther apart than usual, rather than closer together. The occupants should be alternated head to foot so that the heads will be farther apart.

At the first sign of illness the individual should be put to bed, and he should not be permitted to get up until the physician approves. If this were universally done the death rate would be much lowered. The persons who try to keep on their feet, and "stick it out" are those who contribute most to the death rolls.

Leprosy

In the continental United States leprosy is a very rare disease and none of us (unless we have had some very unusual and prolonged exposure) need have any fear of acquiring it. Except in a relatively small area natural conditions do not appear to favor the spread of this disease. This is shown by the fact that although there were formerly a good many imported cases in one part of the country, there was little evidence that any of them transmitted the disease to any one else.

Leprosy is due to a bacterium, *Bacillus* (or *Mycobacterium*) *leprae*. This is a germ closely resembling the tubercle bacillus, and tending to produce a slowly developing disease. It is doubtful if the leprosy bacillus has ever been cultivated outside of the human body in pure culture, or if any of the lower animals have been successfully inoculated. For this reason the study of the disease has been much retarded. The diagnosis, however, may be confirmed by finding the bacilli in the secretions of the patient.

Much has been written about the horrors of leprosy and the public is so much afraid of the disease that near panics have been caused by the rumor that a leper was at large. Perhaps the worst feature of the disease, from the patient's standpoint, is the fact that the leper must not be allowed to mingle with well people while he is still distributing the bacilli. Very often the disability is slight, the suffering very moderate, and

the prospects of an arrest of the disease fairly good. The Government maintains a leprosarium in Louisiana where all known lepers are urged to come to live. Here they get the best care and everything possible is done to restore them to health. In the meantime, they can pursue their avocations and enjoy a variety of community activities, such as games, music, motion pictures, etc. A considerable proportion of the patients, after a period of treatment, are found to be no longer liberating the bacilli and they are permitted to leave the institution, coming back from time to time for reexamination.

Malaria

"Malaria" means literally "bad air." The word is a hangover from the time when this disease was supposed to be caused by some sort of gaseous pollution of the air in the vicinity of swamps and marshes. It is an interesting example of how popular ideas concerning disease are sometimes based on good observations from which incorrect inferences have been drawn. It is quite true that people who live near swamps are more subject to malaria than are upland dwellers, but it is not true that the air itself has anything to do with causing the disease.

This dispute was settled some 40 years ago when the mosquito theory was scientifically tested out. People who had never had malaria were placed in huts located in malarious swamps. Some of them were carefully protected against mosquitoes by screens, while others were given no such protection. Malaria developed only in the latter group. Mosquitoes which had bitten persons with malaria were taken far away to nonmalarious regions and allowed to bite healthy persons, who then developed malaria just as surely as if they had lived in the swamps. By such experiments it was firmly established that malaria is carried only by the bites of mosquitoes.

Only one family of mosquitoes, the anophelines, seems to be able to carry the disease, although a good many species

of this family can do so. In the United States the bulk of the malaria is carried by only two or three kinds, and the great majority of cases are infected by one kind—*Anopheles quadrimaculatus*, so-called because of the four spots on its wings. These insects require water in which to breed. Their eggs are laid on the surface of the water and float there until, under the influence of warmth and moisture, they hatch out into larvae or "wrigglers" such as may be seen in many collections of water in the summer. Anopheline larvae feed on microscopic objects which float on the surface of the water, thus differing from some other varieties which feed on the bottom. This fact is very important to us as will be seen when prevention is discussed. After a pupal stage, during which the insect appears to be composed mostly of head, the adult animal crawls out of a slit in the skin, rests for a while to spread and dry its wings, and then flies off in search of food. Only the females are blood suckers, and consequently only this sex transmits malaria.

The real cause of malaria is a one-celled protozoan animal called a *Plasmodium*. They are so small as to be able to inhabit a red blood corpuscle, and these are about 1/3000 inch in diameter. Nevertheless, they can be plainly seen with a good microscope, and in fact the diagnosis of malaria is made by finding the parasites in a drop of blood taken from the patient by pricking his skin with a needle. When an *Anopheles* mosquito bites a person suffering from malaria she sucks in some of the parasites. These must then undergo a process of development taking from 10 days to 3 weeks before they are in such form and location as to infect another person, but once arrived at this form they may apparently infect people as long as the mosquito lives, which may be all through the winter and into the next season.

The above facts and a great many other interesting particulars have been patiently worked out during the past 40 years, and they all have most important practical significance. Literally millions of dollars could be absolutely wasted in trying to control malaria, if the money were spent without

due regard for some apparently insignificant facts concerning the habits of the mosquitoes.

Malaria is often popularly known as ague (pronounced ā′qū) and "chills and fever." The principal symptoms are periodic attacks of severe chills followed by high fever which is relieved by profuse sweating. Between the attacks the patient may feel perfectly well. The attacks may appear every day, every other day, or every fourth day, according to the particular species of *Plasmodium* concerned; and three of these are known—*P. vivax*, *P. malariae*, and *P. falciparum*. Often the attacks do not show the regularity indicated above, which may be due to double infections. In long-standing cases the spleen may be greatly swollen, and the blood impoverished. Intense infections, especially with *P. falciparum*, if not promptly treated, often end in death.

A great malariologist has said that malaria is the only disease which may occur in such intensity in a place as to make human habitation impossible. With other severe diseases, such as yellow fever, enough persons recover from attacks and become immune to keep the human race alive, but malaria can absolutely prevent the continuation of human life. Fortunately, in the United States we have no such extreme conditions, but the toll of malaria in some Southern States is still very serious, not only from the deaths which it causes but from the economic loss. It has often happened that just as the crops had ripened and were ready to be gathered, so many persons were down with malaria that the crops had to be left to rot.

Malaria formerly extended north into areas where it is now practically unknown, and its disappearance is commonly attributed to the drainage of the land incidental to intensive farming.

The control of malaria is simply told, but often difficult to carry out because of the cost. It consists of keeping the *Anopheles* mosquitoes away from human beings. The best way of going about this depends on local conditions, and is almost wholly a question of how much money is available

compared to the size of the problem. In one case, swamps may be drained to prevent mosquito breeding; in another, ponds may be dusted with Paris green to poison the surface feeding larvae; in other cases the screening of houses is reasonably effective, while introducing minnows to feed on the larvae was found useful in some places as long as the minnows could be kept there. Unfortunately, heavy rains frequently washed them out.

There are several drugs which poison the malaria parasites without doing any permanent damage to the patient, and these are used not only to cure an attack of malaria and keep the patient on his feet, but also to lessen the number of sources at which mosquitoes could become infected, and thus reduce the general prevalence of malaria. But on account of the cost and the difficulty of persuading human beings to do some reasonable things, this method can seldom be relied upon to control malaria.

Malarial attacks can be cured with quinine, sometimes with the help of other drugs; but unless intensive and prolonged treatment is given, some parasites may remain in the body for a long time and cause future attacks.

Meningococcus Meningitis

Meningitis means inflammation of the membranes which cover the brain and spinal cord. It may be caused by a variety of bacteria either as part of a general disease or by the extension of a nearby local inflammation, for example, in the inner parts of the ear. The kind we are dealing with here is that which is caused by one particular group of bacteria—the meningococci—and it is included in this book because it is a definite and typically communicable disease.

Cases of this disease crop up now and then without any general prevalence, but at rather long intervals definite epidemics may occur in which a considerable number of persons, chiefly young children, are attacked. Such epidemics usually occur during the spring months.

The disease usually begins with catarrhal symptoms and sore throat, but soon severe headache, fever, pain in the back of the neck, mental dullness, vomiting, and frequently a peculiar skin rash appear. The death rate in attacked persons is often very high.

The germ of this type of meningitis *Diplococcus (or Neisseria) intracellularis* is a small coccus, or round-shaped organism. It is frequently found by microscopic examination to be inside of the pus cells rather than free in the fluid (hence the second part of its name) and to occur in pairs (diplococci). Serums have been prepared against this coccus, which are probably quite effective in treatment if given sufficiently early in the disease, and if suited to the particular strain of the germ from which the patient is suffering. Unfortunately, there are a number of different races or strains of the organism, each one of which requires its own specific serum. The serum is usually injected into the veins or into the spinal canal so that there may be less delay in its action than if given under the skin. At the present writing, there appears to be a strong hope that a new drug (sulfanilamide) may prove to be very helpful in the treatment of meningococcus meningitis.

The meningococcus enters the body through the mucous membranes of the nose or throat. There it may be found by bacteriological examination, not only in the patient, but also, especially in epidemics, in apparently healthy persons who are carriers. The proportion of carriers among the inmates of institutions, barracks, etc., may be so high (10 percent or more) that attempting to control all of them would be quite out of the question. It is therefore the common practice to restrain only those who have been in recent contact with cases of the disease, and whose secretions are assumed to be more infectious and virulent.

The symptoms of this disease usually appear in about 1 week after the infective exposure (2 to 10 days), and the patient may infect others as long as he liberates virulent cocci from his nose or throat, which is usually not more than about 2 weeks.

The control of epidemics depends upon the early recognition and reporting of cases, the isolation of recognized cases for at least 2 weeks after onset, or longer if the bacteria persist in the secretions, disinfection of all discharges and of articles used by the patient, thorough cleaning of the sick room after the patient leaves it, and in preventing overcrowding. The beds in dormitories should be spaced far apart, and the occupants instructed in the prevention of contact and droplet infection. There is no known method of artificial immunization.

Oxyuriasis (Pinworms)

Pinworms have long been considered such trivial affairs that beyond serving as material for a rather cheap form of humor they have received but little attention from either doctors or the average citizen. And yet these tiny parasites may under some circumstances and in some persons seriously affect the health. The most commonly noted symptom which they cause is itching in the vicinity of the anus which is most apt to come on just after the patient has gone to bed. When this is severe, a good night's sleep is out of the question. Since this condition may last for months or even years, the constant loss of refreshing sleep induces a nervous condition which interferes with the proper enjoyment of life and the proper performance of duties. Children are apt to become irritable, hard to manage, inattentive to school work, and generally cheated out of a proper start in life when they are seriously infested with these worms. Aside from the itching there are apt to be other symptoms such as vague abdominal pains and constipation, and even more serious complications have been reported. As a result of scratching the affected parts, sores and infections may form which further add to the patient's misery.

The reason why this condition has received less attention than it deserves is chiefly that until recently we had no very good means of discovering the parasites when they were present. A search of the feces would be made for parasites

or their eggs and if none were found it would be assumed that there was some other cause for the trouble. A study of the habits of pinworms has shown that this was the wrong way to go about the search. The female worm, filled with eggs, has the habit of creeping out of the bowel when the patient becomes quiet (goes to bed) for the purpose of depositing the eggs in the creases of skin which surround the anus. Scrapings from these creases, taken in the morning before the patient bathes, and examined under the microscope will frequently reveal numbers of eggs, when a mere examination of the feces would have shown nothing. A swab or scraper made of a small square of cellophane wrapped around the rounded end of a glass rod or wooden skewer provides a good means of collecting the specimen. The cellophane can then be spread out on a glass slide and placed under the microscope for examination.

There are several treatments for pinworms which are effective if faithfully carried out. Some of these are drugs which should be prescribed by a doctor, since there may be some danger in their improper use, but the simplest treatment consists of plain enemas taken every night for two weeks. Unfortunately, it is of no use to cure a case of pinworms if other members of the family are infested (as they usually are), because the patient will be promptly reinfested from the others. All members of the family who are infested should therefore be treated at once. The pinworm eggs get onto the bedclothes, and the floors and furniture of rooms and may easily become transferred to the mouths of people living in those surroundings. As a rule, the eggs do not remain alive for more than about 10 days, so that if all the family takes treatment during that time and becomes cured, the surroundings should be free from living eggs by the end of that period.

It may still appear that this is a trivial thing to discuss, and it is true that many stolid people have pinworms without being annoyed. It is well to remember, however, if symptoms such as we have described are complained of, if sleep is being lost and the patient is becoming nervous and unable to attend

properly to work or studies, that pinworms may be the cause, and it is also well to be informed on the proper means of making a diagnosis and the reasons for failure of incomplete treatment.

Paratyphoid Fever

This term covers a group of infections which closely resemble typhoid fever (which see) in the symptoms, the method of transmission, and the bacteria which cause them. The chief differences are that paratyphoid is in general a much milder and less deadly disease, and one of shorter duration than typhoid, while the bacteria which cause it can readily be distinguished from the typhoid bacillus in the laboratory. On the other hand, paratyphoid fever resembles also some of the food poisonings (which see) and here the differences are chiefly that the fever lasts longer in paratyphoid (seldom over 2 days in food poisoning), that the means of transmission are different, and that the bacteria causing the two conditions can be distinguished.

Paratyphoid fever is now relatively rare in the United States, but it played a considerable part in causing illness among troops during the World War. Still, small outbreaks are not uncommon and they are now due chiefly to direct contact with cases or carriers, since our water supplies have become better protected and the use of pasteurized milk is more general. The diagnosis can be accurately and surely made only by laboratory methods, which include serum agglutination tests (in which the patient's serum clumps a suspension of the kind of bacilli with which he is infected), and finding the particular bacilli in the discharges, feces and urine, of the sick person.

The incubation period of paratyphoid fever is usually about a week, and the patient remains infectious as long as he liberates the bacilli, which can be determined by bacteriological examinations. Chronic carriers occur in this disease, as in typhoid fever.

Protective vaccines can be used to prevent infection in

persons who by reason of some special exposure—soldiers or travelers, for example—may run extraordinary risks, but there is little reason for immunizing the general population. The means of prevention and control are the same as in the case of typhoid fever. There are no specific remedies.

Parotitis, Epidemic (Mumps)

Parotitis means merely inflammation of the parotid gland. This is the salivary gland which partially surrounds the ear at its attachment to the head. Epidemic parotitis, or mumps, however, is a communicable disease of the whole body in which the chief symptoms, aside from the fever, are swellings and pain in the parotid, and sometimes the other salivary glands. It is usually one-sided but may be double.

The chief importance of mumps is its tendency to occur in epidemics which may disable all at one time a large proportion of the youthful members of schools and colleges, or new recruits in military organizations, and give everybody a bad time for a week or so. The death rate is ordinarily very low.

Mumps is generally believed to be caused by a filterable virus, and to be transmitted by the secretions of the mouth, by contact with the patient, droplet infection, and the transfer of recently soiled articles. Only the early recognition of each case and his isolation with disinfection of his discharges and articles handled by him, can prevent the rapid spread where many young people who have not had the disease are closely associated.

An attack of mumps usually confers lasting immunity, although second attacks sometimes occur. There are no specific laboratory aids to diagnosis, but the disease is usually easily recognized by the tender, painful enlargement in front of the ear without reddening of the covering skin.

The disease is transmissible as long as the glands remain swollen, but they usually return to normal size by the end of 2 weeks. The incubation period is longer than it is in many communicable diseases—from 12 to 26 days, usually about 18.

Convalescent serum has been used successfully to some extent to prevent the disease in exposed persons; its general use is hardly practicable in view of the generally mild course of the ailment, and the fact that a lasting active immunity nearly always follows an attack. It might be advised to prevent an attack in children who are already sick with some other condition, and to whom the added mumps would be a serious danger.

Convalescent serum is discussed more fully under the title Rubeola, or measles. It is the blood serum of a person who has recovered from a given disease and which therefore is assumed to contain protective antibodies. When administered, it confers at best only a temporary passive immunity. (See Diphtheria.)

Pertussis (Whooping Cough)

Although many people think of whooping cough as a rather mild or even somewhat amusing affliction, vital statistics clearly show that they are wrong. This disease is a frequent cause of death, especially in very young children, and is always to be regarded seriously.

A certain bacillus (*Hemophilus pertussis*) is so constantly found in expectorated material in this disease that it is commonly believed to be the real cause, but it is possible that a filterable virus may also be responsible. At any rate the finding of this bacillus in the sputum by bacteriological examination is a great aid in diagnosis and in determining that a patient is still dangerous to others.

After an incubation period of 1 to 2 weeks the patient begins to show symptoms of what we call a "cold on the chest." That is, the trouble is usually located in the larynx, trachea (windpipe), and bronchial tubes, rather than in the nose and throat. There is some cough and slight fever.

After a week or two of this, during which the diagnosis cannot be made on symptoms alone, the cough takes on a new character. It becomes paroxysmal—that is, one cough follows

another so rapidly that the patient cannot breathe between them. Consequently his face turns red, the veins stand out, and his eyes water. Frequently a plug of thick mucus is brought up which ends the coughing spell. When the air is finally admitted to the chest it causes a crowing sound, which is known as the "whoop." Vomiting frequently occurs. These coughing spells may be so severe that eating and retaining food becomes difficult, and the state of nutrition suffers considerably.

After from 2 to 4 weeks in this stage the disease gradually subsides in the majority of cases. Complications may occur at any time, the most serious of these being bronchopneumonia.

Owing largely to the fact that whooping cough begins very much like any ordinary cold, and the added fact that even in the early stages it is easily communicable, it is difficult to prevent its spread. On general principles, young children should be kept away from others who have colds. School children should be kept out of school for at least 10 days after exposure to known cases, unless they are already immune. Known cases should be kept out of school for at least 3 weeks from the beginning of the paroxysmal stage and until released by the health department. The sputum of the patient and the articles soiled with it should be disinfected.

There are two laboratory aids to diagnosis which should be employed where the means are available—the bacteriological examination of sputum, and the differential blood count. In whooping cough, the total number of white blood corpuscles is increased, and the proportion of one variety, the lymphocytes, is much greater than normal.

Vaccines have been prepared which have been widely used in some localities for the purpose of artificially immunizing children against whooping cough. Scientific opinion is still divided concerning their usefulness. The same is true concerning the use of convalescent serum in the treatment of the disease.

Plague

Plague (bubonic plague, pest, the Black Death) is one of the greatest man-killers of history. In some parts of the world it is present more or less all the time—that is endemic. Occasionally in those areas it may suddenly flare up into a violent epidemic. And at a number of times during human history it has spread over practically the whole habitable globe, killing millions of people—that is pandemic.

Plague is one of the most forcible arguments for the maintaining of a well organized and efficient state of civilization. We cannot foretell in just what direction civilization is headed, up or down. In the field of public health, there is, however, one thing we can safely predict. If citizens or governments gradually become lax, if through war or revolution the functioning of civilized society breaks down, these great epidemics will surely return and plague will be among them. They are held in check only by artificial man-made safeguards, and the margin of safety is not very wide.

The conquest of plague by science has taken place only during the past half century. Before that, man was as helpless in the face of an epidemic of plague as he still is with regard to an influenza epidemic. The great efforts which he made to stamp out the plague were wasted because they were not directed by scientific knowledge. A picture of one of these great epidemics can be gained by reading Defoe's (the author of Robinson Crusoe) account of the Great Plague of London.

Fortunately, just a few scraps of information gained by painstaking medical research are all that are necessary for us to prevent the spread of plague. They are: (1) Plague is a natural disease of rats and other small animals. (2) It is conveyed from one animal to another by means of fleas. (3) It is conveyed from animals to man by the same means. (4) Plague is caused by a bacterium, *Bacillus* (or *Pasteurella*) *pestis*. With this knowledge and the organization necessary to apply it we need have no fear of an extensive plague outbreak in the United States.

There is no need here to describe the symptoms of plague further than to say that it is an acute disease with fever, swelling and suppuration of lymphatic glands, great prostration, and death in a large percentage of cases. Sometimes it appears in the form of a virulent pneumonia, and then the sputum of the patient is dangerous to persons in contact with the case. This form is the only one which is strictly communicable from person to person.

Other diseases which are transmitted by insects are discussed in this book (e. g., Dengue, Malaria, Yellow Fever). When these diseases are caused by minute animals or filterable viruses it is noted that often a considerable time must elapse after the insect sucks the infected blood before another bite will cause infection. In the case of a bacterial infection such as plague, this period would be much shorter, since the bacteria multiply rapidly and do not have to undergo a cycle of development inside of the insect. It is considered probable that fleas do not convey the disease by the act of biting, but that they deposit bacteria in their feces near the wound. Then when the person scratches the bite the bacteria are rubbed into the opening made by the flea's beak.

Few Americans know, perhaps, that we have endemic plague in the United States. It is a fact, however, that the plague smoulders among the ground squirrels in a rather large area in some far Western States. The assumption is that these animals were originally infected many years ago when there was an outbreak of plague among rats and people in some of the coast cities. Ever since this infection was discovered, it has been necessary to keep up a campaign against it in order to prevent it from invading densely inhabited areas. This has been successful thus far, and only a few human infections have occurred during recent years. Aside from these local precautions against ground squirrels, the prevention of plague is principally directed against rats.

The Federal Government, through its quarantine service, keeps up a vigorous anti-rat campaign on the ships which visit our shores. Cities are urged to "build out" the rat by the use

of concrete in warehouses in which grain and other foods are stored, and to prevent the breeding of rats in such places as refuse dumps. Where plague actually prevails, the disease is combated by rat-trapping and poisoning. These operations are largely controlled by bacteriological laboratory examinations, which discover to just what areas the disease is confined, and direct the anti-rat measures against these areas. It is apparent, therefore, that a highly organized and efficient state of society is necessary for the prevention of the spread of plague.

Pneumonia, Acute Lobar

Pneumonia means inflammation of the lungs. The respiratory functions of the lungs are encroached upon by solidification of large or small areas. In addition, toxins are absorbed which poison other vital organs and may cause death in this way.

Pneumonia is one of the chief causes of death, and consequently every precaution should be taken to prevent its spread. Persons in the very best of health probably have a considerable resistance to this disease and do not run a great deal of risk in attending the sick. But if the general health is run down, or one already suffers from some respiratory disease, the danger is much greater. For example, the chief cause of death during influenza epidemics is not the influenza itself, but the pneumonia which so frequently attacks its victims.

Pneumonia is caused by a variety of bacterial organisms, most commonly the *pneumococcus*. Of this germ there are a number of different varieties, and it is important in treatment of a case that the particular one should be identified very early in the disease. This is because each variety requires its own kind of serum. Microscopic tests can now be made in a very short time to find out the variety present, and this should be done in every case so far as possible. Pneumococci are surrounded with a delicate substance known as the capsule. The person who is determining the type of pneumococci in the sputum from a certain patient is provided with a number of

type serums. To a drop of each of these on a glass slide he adds a little of the sputum. The serum which "belongs to" the type of pneumococci in the sputum causes their capsules to swell up, which can readily be seen through the microscope. This then is the type of serum which should be used in treating this particular patient. The serum is very effective in some types of infection, but of little use thus far in others. Recently considerable success in the treatment of pneumonia has been reported by the use of one of the sulfanilamide compounds. In every bad cold with fever, the doctor should be called. If he finds pneumonia, the well-equipped modern health department will have the facilities to type sputum and it will have sera of demonstrated effectiveness for the commoner types of pneumonia.

Oxygen, if given from the beginning of the disease under a special tent placed over the bed, and in suitable cases the use of derivatives of the new drug sulfanilamide, will perhaps reduce the death rate from pneumonia appreciably in the next few years.

Pneumonia develops usually within a very few days after exposure. There is frequently a severe chill, fever, a pain in the chest, cough, difficulty in breathing, and prostration. Transfer is by means of droplets, contact with the patient and soiled articles used by the patient. Pneumonia patients should therefore be isolated at once and attended only by nurses who will take the necessary precautions to avoid the infection themselves, and to disinfect all objects used by the patient before they are removed from the sick room. Thorough cleaning of the room itself, after the patient leaves it, is all that is necessary.

In many cases of pneumonia the patient gives a history of unusual exposure to cold or wet shortly before the attack, or perhaps of some very fatiguing experience. It is therefore only good common sense to avoid such exposures and experiences when this is possible, or if not, to take some sensible precautions as soon as possible afterwards. The use of warm clothing, raincoats, umbrellas, and rubbers has probably

prevented many a case of pneumonia. A warm bath with a good rub-down, a change to dry clothing and a long night's sleep have been equally serviceable after exposure. Alcohol predisposes to rather than prevents pneumonia, since it renders the body and the mind insensitive to the dangerous influences. Remember that the bacteria which actually cause the disease may be found in the throats of healthy people much of the time. All that is necessary to give them a chance is a condition of lowered resistance.

On account of the high prevalence of the disease many attempts have been made to prepare vaccines which would protect against pneumonia, and some of these have been tried out on a large scale, with but indifferent or inconclusive results. Possibly some preparation will eventually be devised which will be worthy of general adoption.

Poliomyelitis (Infantile Paralysis)

The spinal cord is an elongated cylinder of nerve tissue extending from the brain above to the "small of the back" below, in a flexible bony case formed by the bones of the spinal column. Every inch or so of its length pairs of nerves are given off which pass to the muscles and skin of the body and limbs. In cross section the cord is seen to be composed of white matter around the outside while in the center there is a roughly H-shaped collection of gray matter. The white matter is composed of nerve fibers which conduct nerve impulses, but the gray matter is composed of cells which originate impulses or relay them from the brain. Cells in the front (anterior) half of the H deal with motor impulses which produce motion in muscles, while cells in the back (posterior) half of the H have to do with sensations which come from the skin, joints, etc., to the spinal cord on their way to the brain.

Poliomyelitis is an inflammation affecting chiefly the gray matter in the anterior portion of the H (*polio*—gray; *myelos*—marrow or pith; *itis*—inflammation). The motor cells become involved in this process and a variable number are permanently destroyed. Consequently, the muscle fibers which

were supplied with motor impulses from these cells are no longer able to contract—in other words they become paralyzed. Fortunately, in many cases, only a few cells are destroyed so that the resulting muscular weakness is only slight. In most cases also some of the cells are only temporarily incapacitated so that muscular strength is largely restored. In a small proportion of all cases very extensive and permanent paralysis with withering of the affected muscles takes place, and in a few cases death occurs during the acute attack.

Poliomyelitis is caused by a filterable virus which occurs in the nasal and throat secretions of sick persons and carriers, and which enters the body through the upper part of the mucous membrane of the nose. Symptoms usually develop between 7 and 14 days after exposure. The first symptoms may be very indefinite, and unless an epidemic was in progress, they might escape notice. Usually, however, there is moderate fever, headache, perhaps vomiting and constipation, some stiffness or pain in the back of the neck, and the patient may be drowsy or irritable. Many cases are believed to recover without any further symptoms, but in the serious cases paralysis of the muscles of the legs or arms or other portions appears rather rapidly. The affected parts are limp and motionless. Usually the damage appears to be much worse during the early days of paralysis than it proves to be after some weeks or months of careful treatment. It is very important that the patient be put to bed on the first appearance of symptoms, and that the paralyzed muscles be protected from the weight of bedclothes and other injuries by means of frames or splints. Otherwise, serious deformities often occur. After the acute stages are over, skillful massage, special exercises, etc., will often accomplish wonders in restoring the usefulness of the paralyzed muscles.

In cases in which the muscles of respiration become paralyzed, life is often saved by artificial respiration administered by some form of respiratory cabinet or "iron lung."

It is believed that infection is commonly derived from healthy carriers rather than from recognized cases. Nevertheless, all cases should be immediately isolated and their secre-

tions and articles used by them disinfected. Persons known to have been exposed should be isolated for 14 days. Epidemics have been difficult to check, chiefly because it is so hard to prevent contact with unrecognized healthy carriers and still carry on the necessary activities of a community. For this reason, visiting about and attending gatherings, especially where children are concerned, is to be discouraged during epidemics.

After recovery the patient usually enjoys a lifelong immunity to further attacks. The blood serum of convalescent patients has the property of destroying the virus when mixed with it in a test tube. This fact led to the use of convalescent serum in the treatment of the disease. Unfortunately, there is no general agreement as to the usefulness of this serum. After paralysis has developed, it is generally regarded as useless. If given before paralysis occurs, one can never be sure that paralysis would have developed in a particular case if no treatment had been given. This is the chief reason for scientific skepticism, but in spite of this, many doctors believe in giving the patient the benefit of the doubt.

Psittacosis (Parrot Fever)

Parrot fever is a disease of birds, chiefly of the parrot family, although canaries have been known to have it. It is very infectious for people who are in the vicinity of the sick birds. Sick people also have given the disease to others, but the danger is not as great as in the case of birds.

When a considerable outbreak occurred in the United States some years ago, the disease was regarded as extremely rare, and few doctors had any reason to be acquainted with it. Moreover, such studies as had been made had apparently shown that the disease was caused by a bacterium. In that case the handling of an epidemic would have been along accustomed lines, and with due precautions no great danger of infection was to be feared. It soon developed, however, that ordinary precautions were of little use. Experiments showed definitely that the disease was due to a filterable virus which was capable of

infecting the surroundings of sick parrots for a considerable distance. So many investigators were taken sick (with several deaths among them) that experiments were discontinued as soon as the main facts were learned, and we still have doubts as to how the virus is carried. It has been suspected, however, that it may be carried on the "powder down" which parrots and some other birds develop on their skins, and which is so light that it may float about in the air for some time. Infection apparently takes place through the nose and throat. Special precautions should be taken to prevent such infection by persons who must come in contact with the diseased birds or sick patients. Masks of many thicknesses of fine gauze should be worn.

The birds which have caused these outbreaks have chiefly been such as were recently imported, rather than old pets which had been in the family for some time. The Government was obliged to declare a quarantine against the importation of parrots for a while, and even now permits their importation only under certain restrictive precautions. Small epidemics occurred in pet dealers' establishments, in the homes of persons who owned parrots (mostly recently purchased), and in at least one case in a department store where pet birds were exhibited as a sales attraction.

Although healthy carriers are known to occur among the birds, this has not been shown to be the case among people.

Psittacosis is a serious disease with a high death rate among persons who are attacked. It begins like so many diseases with chills, fever, and headache, but soon shows signs of pneumonia, and the patient becomes greatly prostrated, and may be delirious. The diagnosis may be confirmed by injecting blood or sputum into birds or mice and then examining their organs microscopically; but it is usually clear enough when association with a sick parrot or other bird of that family (such as parrakeets and love birds) has been observed.

The incubation period is between 6 and 15 days.

The prevention of psittacosis is a matter in which both the private citizen and the health office have a responsibility.

Many persons acquired the disease during the "epidemic" by the silliest sort of sentimentality such as kissing the sick parrots or feeding them from their own lips. Sick parrots should be regarded as highly dangerous. The Government affords the protection against the importation of the disease which has been mentioned, and investigates reported outbreaks of sickness among the pets in breeders' and dealers' establishments. The bedside precautions regarding human patients have been mentioned and include the disinfection of all discharges and handled articles. After the patient has left the sickroom the local health office should be consulted regarding terminal disinfection.

Rabies (Hydrophobia)

Misunderstanding regarding this disease on the part of the public has resulted in a great deal of unnecessary hysteria and mental suffering. Misunderstanding has caused also much well-meaning but ignorant interference with the control and eradication of the disease. The statements in this article have been very carefully considered and may be relied upon as representing the truth as far as scientific research has been able to discover it.

Some persons, mistakenly representing themselves as dog lovers, have gone so far as to deny that there was such a disease as rabies, or that dogs had any part in causing such a disease. Since the truth is that dogs are the chief sufferers from rabies and that people only rarely contract it, it is plain that these persons have done a great injustice to, and caused much suffering among, the very animals of which they profess to be so fond, by opposing reasonable and necessary measures requiring the control of dogs.

To scientists who have worked with rabies in the laboratory, rabies is just as real as planks and nails are to a carpenter. A great deal has been learned about it, enough in fact to get rid of it entirely if the whole-hearted support of the public could be secured. Unfortunately, the one essential missing fact is how to cure it. When it once develops it is almost

uniformly fatal, although a few instances of recovery have been reported.

Rabies is kept alive in nature chiefly by animals of the dog tribe—dogs, wolves, coyotes, foxes, etc. In some Western areas skunks apparently harbor the infection, and in South America, blood-sucking bats are believed to carry it. Dogs and their relatives have two characteristics which make them prone to have and to transmit this infection. They are sociable or gregarious animals, and their sociable encounters frequently end up, like many a convivial evening, in a free for all fight. They use teeth in these combats and the teeth are covered with saliva. The rabies germ escapes from the body through the saliva. When the teeth penetrate the skin and the germ-laden saliva enters the tissues underneath, it is probable that some nerve fibres will be injured. The virus of rabies has a great affinity for nerve tissue, and travels along the nerves until it reaches the brain. Here it sets up changes which result in the symptoms of, and finally in death from, rabies.

There are two forms of rabies, the furious and the paralytic form. In the first, the animal, after a period of restlessness and curious behavior, is apt to set out on a long journey as if trying to get away from some impending danger. Then he goes mad, that is he loses his reason or becomes insane. He is apt to bite anything that comes in his way, friend or foe, human or animal. He will even bite at and swallow such objects as sticks or stones. There is little doubt that his sufferings are severe. He becomes worn out with his exertions, thin and bedraggled. Then the paralytic stage sets in. His throat muscles become paralyzed and he can no longer swallow, his legs give out and he cannot walk, and in a day or two more he dies. In the paralytic form the wandering and the biting symptoms are omitted, and paralysis comes on very early in the disease.

It is doubtful which form of dog rabies is the more dangerous to human beings. A person has some warning in the former case and can run away, or if caught, possibly protect himself with a stick or keep off the bites with a coat. In the

paralytic form on the other hand, one sees only a pitifully sick dog which excites sympathy and the desire to help. He seems to have something in his throat, and one may try to extract it with a finger. In this way, many people have received scratches from the teeth which have placed them in danger of acquiring hydrophobia.

Probably the great majority of warm blooded animals can suffer from rabies if infected. However, due partly to their habits, and partly to differences in the excretion of the virus, most of them do not tend to perpetuate the disease as the dog does. This disease is due to a filterable virus. It has an unusually long incubation period, in nature practically never less than 10 days and frequently several weeks or even months. In people it is usually a month or more, and this is a very fortunate circumstance because it gives time for protection to be secured through the administration of anti-rabic vaccine (the Pasteur treatment).

There are no laboratory tests which will surely diagnose this condition during the life of the animal, but there are some peculiar appearances found in the brain on microscopic examination after death which make the diagnosis certain (Negri bodies).

There are some practical points with regard to rabies with which everybody should be familiar.

A sick dog should always be regarded with suspicion and if possible confined until it has been seen by a veterinarian or a representative of the health department. If confinement requires tying the animal up, this should be done with a chain and not with a rope. Only a mature and responsible person should handle the animal, and this should be done with care to prevent being bitten. One should never try to remove suspected bones from the throat—let an expert do it. A change of disposition is a frequent early symptom of rabies. The animal may become unusually affectionate or on the contrary more irritable and quarrelsome than usual. Dog owners should regard such symptoms with suspicion and be prepared to take immediate precautions.

When a dog has bitten a person it is a mistake to kill the animal immediately unless the animal is evidently mad or unless it is necessary to prevent bystanders from being bitten. What we want to know as soon as possible is whether the bite is dangerous or not—in other words, whether the dog has rabies. If the dog, not having any symptoms of rabies, should be immediately killed we might never be able to tell whether it was mad or not. The Negri bodies do not develop in the early stages of the disease, so that a laboratory examination would still leave us in doubt. The animal should be turned over to the health department, a veterinarian, or the police, or securely confined where it can do no further harm, but can be fed and watched from day to day. If, after 2 weeks of observation the animal is still well, no danger need be feared from the bite. In all cases, however, the health department should be notified. If the dog becomes sick and dies, or if an apparently mad dog has been killed, the entire animal or the head should be sent to the health department for examination.

Immediately after a person has received a bite from a dog he should have the wound cauterized. The proper way to do this is by using fuming nitric acid obtainable at drug stores. The acid can be introduced with a match stick, or if the wound is large with a medicine dropper. Enough should be used to reach all parts and depths of the wound but unnecessary burning of the surrounding skin should be avoided. It causes a sharp burning pain which lasts about 1 minute. It does not cause subsequent scarring if properly used. The next thing to consider is whether it is necessary or not for the bitten person to take protective inoculations. This must be settled in each case by a doctor who can consider all the factors and take the responsibility of a decision. In many cases he will be obliged to give the benefit of doubt to the patient, because much of the evidence may not be clear. Perhaps the dog was a strange one which escaped and was never seen again. No one could possibly tell whether it was mad or not. Perhaps there is doubt whether some slight

scratches were actually made by the dog. Perhaps the dog was killed so promptly that the laboratory cannot say whether it had rabies or not.

In plain cases, actual wounds made by the teeth of a mad dog, there is no doubt that the Pasteur treatment (or its equivalent) should be administered, this being the best known method of preventing the disease. This material is prepared in various ways by different firms, but statistics do not show appreciable differences in the results secured. It may be obtained at short notice from drug stores, and is to be administered hypodermically by a doctor. Daily injections lasting about 2 weeks are usually given. The material, whatever the method of preparation, is secured from the brains or spinal cords of rabbits which have been injected with a modified form of rabies virus known as fixed virus, which was originally produced by Pasteur.

The claim that rabies can be eradicated if the whole-hearted support of the public is secured, is not an idle one. It has been accomplished in England merely by the muzzling or restraint of all dogs for a period of several months. If this could be thoroughly done, rabies would die out and we should not have to worry about it any more either on account of our pets or of ourselves. But England is a relatively small country with uniform laws (and also a very thorough enforcement of laws). Such a program would be very difficult to carry out in our country with its many States having different laws (and in many parts a rather lax enforcement of laws). If one area succeeded in cleaning up, it would be promptly reinfected from some other area, since dogs are no respecters of State lines. Each locality therefore has to do the best it can to keep down the prevalence of the disease, without much hope of permanent eradication. The measure of greatest importance is the destruction of ownerless wandering dogs. Though these animals excite our sympathy, their lives are unhappy ones at best, and it is no unkindness to terminate them humanely. In order to distinguish ownerless dogs it is necessary to license and tag every dog which has an owner. An owner

who will not take that much trouble for his pet does not deserve to keep it, and probably would be an irresponsible sort of person at any rate and indifferent to the damage and nuisance caused by his pet to other animals or to people.

The germ which causes rabies is a filterable virus. The immunity caused by the Pasteur treatment is an active immunity and consequently takes some time to develop. This is why the treatment should be given promptly when the decision has been made.

Rheumatic Fever

Rheumatic fever is one of our most important diseases, but curiously it is not included in the list of communicable diseases referred to in our preface. Neither is it regarded in general as a reportable disease—one which should be reported to the health department in each case. The reason for these omissions is doubtless that scientists have not yet arrived at any general agreement as to the cause of the disease nor as to the degree to which it is communicable, in spite of a great deal of serious study. And yet, rheumatic fever is responsible for some 25,000 to 30,000 deaths each year in the United States (almost as many as are caused by automobile accidents) according to the best estimates which we are able to make.

Rheumatic fever is best regarded as a chronic disease having acute periods between which, at long or short intervals, there are apt to be times when no marked symptoms are observed. The real significance of rheumatic fever is due to its effect on the heart. It is probable that some damage is done to the heart during every acute attack of rheumatic fever. This may fortunately be slight, and the patient may recover completely, but in a large proportion of cases the damage is serious and permanent, and is added to by each successive attack.

For a long time doctors relied upon painful swelling of the joints in order to make a diagnosis of rheumatic fever. It is now recognized that the heart may be seriously attacked without much or even any effect on the joints being noticed. In any event the joint involvement, painful though it is, seldom or

'. S. A.—Vachon

COMMUNITY ACTION IS DEMANDED

"The sick are poor and the poor are ick" . . . a stark reality which every ommunity must meet intelligently or ay the Piper much too heavily. orty million persons in the United States earn less than $800 a year and must depend upon free clinics. Recent Nation-wide surveys show that there are no such facilities for some 46 percent of these Americans.

V. P. A.

Infantile paralysis is a ravager of nerves. T
hope for recovery every victim should hav
equal opportunity for treatment: First, cor
plete rest for the injured part of the body, the
passive exercise and massage followed by sp
cial physical and occupational therapy an
special rehabilitation schools.

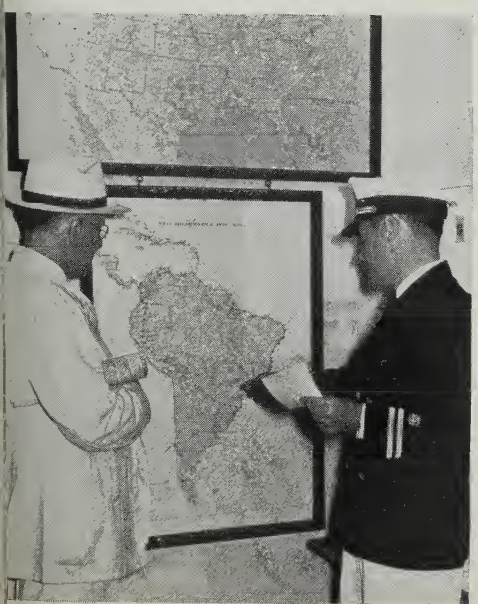
W. P. A.—Photo

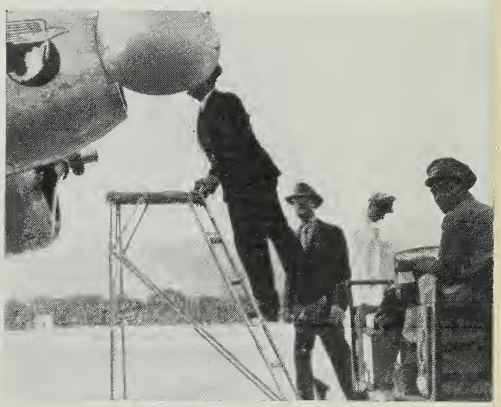
Year in and year out a never-ending battle against disease is being waged at every port of entry into this country. Every ship and its crew and passengers are checked for communicable diseases.

Most dread of these is the bubonic plague which is carried from infected areas by rats. Cyanide gas is used to kill all rats which might be hiding in the hold. These are immediately examined at laboratories and discovery of plague is a signal for instant quarantine of that ship and the strictest precautions with all other boats from the same part of the world.

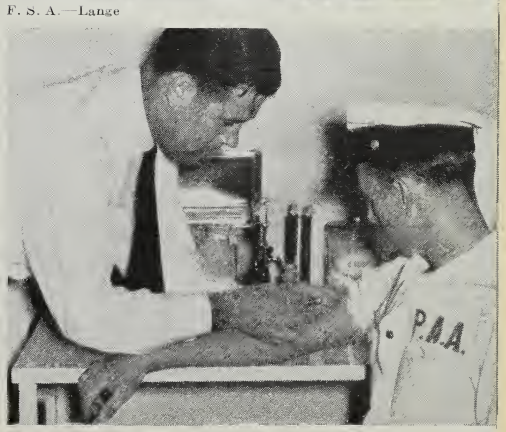
Latest threat to our national health arises from high speed air travel. Below an official is showing how one can now be infected with yellow fever in South America and return to the United States before symptoms appear.

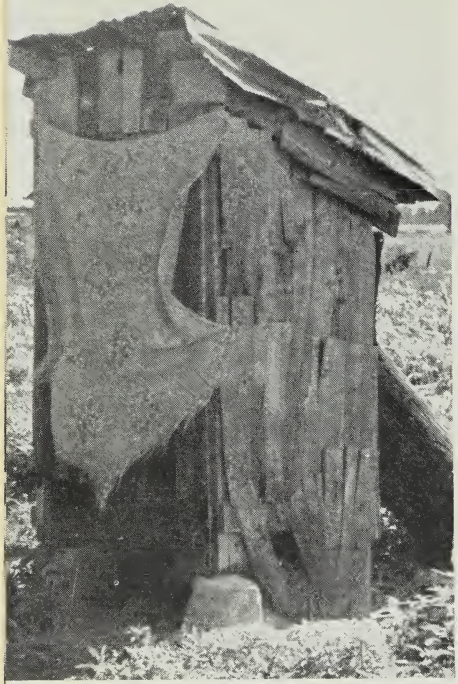
All ground crews and other aviation employees are required to be vaccinated and all incoming planes are closely inspected and sprayed for the destruction of yellow fever mosquitoes.

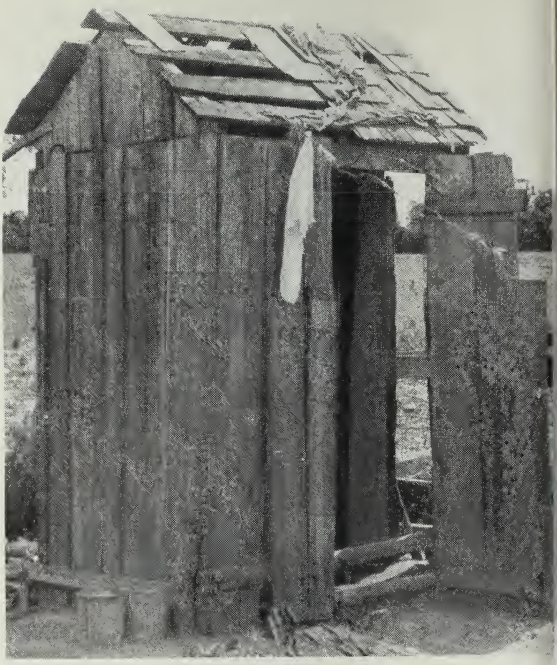




F. S. A.—Lange







F. S. A.—L

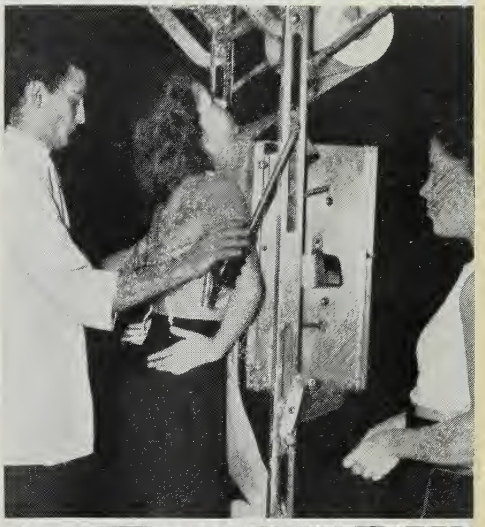
More than 3,000,000 sanitary pit privies, recently built with W. P. A. assistance, have been a major contribution to the health of many rural communities.

W. P.

W. P. A.

he important point in curbing the spread tuberculosis is strict segregation of atients. In the absence of adequate anatorium facilities the W. P. A. assisted building thousands of one-room cottages be loaned to patients.

Other effective preventive measures are egular X-ray check-ups, either free or at ominal cost, and conscientious attention the nutrition needs of children of school ge. Proper food is a front line bulwark the fight against tuberculosis.



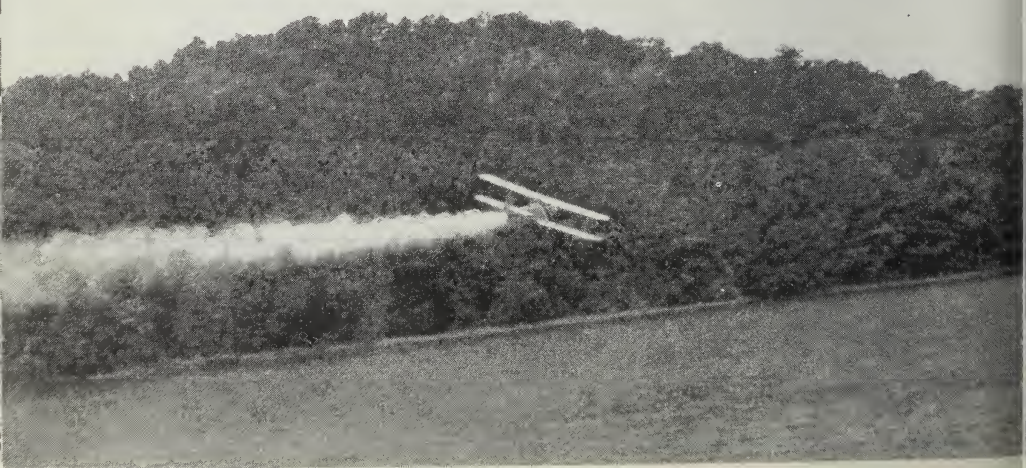
Washington Star

. P. A.

F. S. A.—I

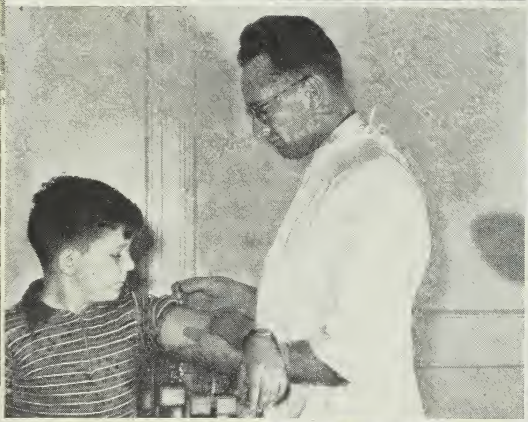
In well-sealed and screened homes such as the one above, built with the assistance of Government funds, thousands of farm families in the South are enjoying increased protection against the malaria mosquito. Federal and State Governments have joined forces in draining and spraying countless square miles of mosquito breeding swamps, projects which are found highly effective in cutting down the South's appalling economic loss from malaria.

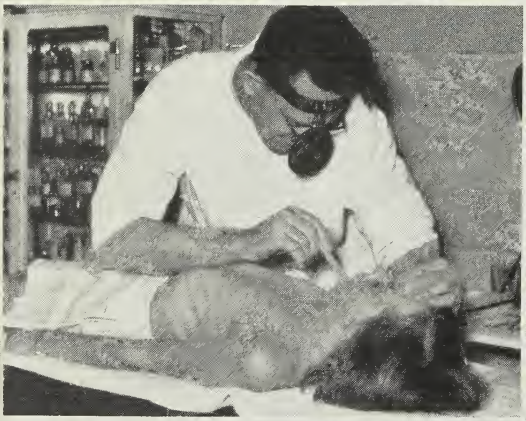
W. P.



tures, Inc.

An aroused citizenry in several progressive American communities has brought the fight against syphilis out into the open. Highly infectious, syphilis strikes 1 in 10 adults in America. Spreading in different ways, it claims a million new victims every year, almost half of them innocently infected. Free blood tests with treatments at nominal cost are essential to the success of any campaign against this scourge. The Government aids such campaigns.





Aside from all humanitarian co
siderations, the soundest investme
that any community can make is
its children's health. Recognizing thi
diphtheria and smallpox immuniz
tion should be made available to eve
child, while health courses and regul
physical examinations should take the
rightful place in the school curriculur

never results in permanent stiffness or deformity. Although rheumatic fever is a crippling disease, its victims are crippled in the heart rather than in the limbs.

From all studies which have been made it appears that rheumatic fever usually makes its first attack on children between the ages of 5 and 15. Subsequent attacks may be frequent or rare, or there may be none, but usually the disease progresses slowly and the average age at death is about 30 years. It also appears to be much more common among the children of the poor than among those of the comfortably well off, more common in cities than in the country, and much more common in the northern parts of the country than in the far South. Acute attacks are apt to occur in the winter and spring.

The cause of rheumatic fever is still unknown or at least not generally accepted. Some students believe it to be due to streptococci, others to a filterable virus, some think it is an allergic (see Glossary) disease, and others that it is indirectly due to nutritional defects. But the fact remains that the disease has the general appearance of an infectious disease, due to some sort of a micro-organism. Several cases may often be found in a single family. Small outbreaks have occurred in institutions. These facts have led some people to think that it is communicable, yet it certainly does not spread through a community in epidemics as many of our communicable diseases do.

In spite of our confessed ignorance concerning many features of rheumatic fever there are some lessons of value to be learned concerning it. Complaints of sore joints or "growing pains" among children should not be ignored. They may indicate rheumatic fever, and a doctor should examine the child, giving especial attention to the heart. Hopes of recovery depend largely on the extent to which rest in bed can be carried out. This may require weeks or months and is best carried out in an institution where expert care can be secured. Even during the quiet periods of the disease such children should be protected against undue exertion and exposure. A general lesson which this disease and many another illustrates

is the profound influence of economic condition upon health. It can be predicted almost with certainty that rheumatic fever will gradually disappear if our general economic conditions improve, and will increase if the contrary condition of society prevails. The disease does not thrive where people are well fed, well clothed, and provided with good homes without crowding.

It is true that some cases develop under these favorable conditions, but this is not the rule.

Ringworm

This disease is included here, not because it is very important as a cause of ill health or death, but because it is highly communicable under some circumstances, often very annoying, and especially because it is the single illustration in this book of a disease caused by a class of microscopic plants somewhat higher in the scale than bacteria, and known as molds (also spelled moulds).

One would have to enter into a good many fine distinctions to explain the difference between some kinds of molds and some kinds of bacteria, but in general it may be said that bacteria are one-celled microscopic plants which reproduce by simply splitting in two (fission), while molds are of more complicated structure and reproduce by forming spores. The molds which cause ringworm can be grown artificially and the colonies which they form resemble the familiar molds seen on foodstuffs, damp walls, etc., but the latter are known to cause disease in only a few instances and are not to be especially feared.

There are probably many kinds of molds which can cause ringworm. Some have a tendency to attack certain parts of the body, such as the scalp, the trunk, the groin, or the feet, and some are prevalent in some parts of the country and rare in others. These all of course have their particular names, but the most common are varieties of *Trichophyton*, *Epidermophyton*, or *Microsporon*.

In fields and pastures one often sees colonies of small toadstools arranged in the form of complete or partial circles—"fairy rings", they have been called. These toadstools are higher forms of fungi, while molds are among the lower forms. Both have a tendency to spread by means of tiny threads in a direction away from a center. Consequently, the sores produced in ringworm have a tendency to assume a crescentic or circular shape if seen early in the disease before scratching and scabs have obscured them.

The sores of ringworm vary greatly in severity and appearance according to the part of the body attacked and the stage at which they are seen. On the scalp they at first form dry reddened patches often covered with scales, which heal at the center and spread at the edges. They cause itching, and when the patient scratches them they may bleed and form scabs, or become infected with bacteria which cause the formation of pus. On the feet the first thing noticed is frequently an itching which leads to the discovery of tiny pearly blebs (vesicles) which appear to be deep in the skin. These may burst and pour out liquid enough to wet the stockings. Or sometimes all that is noticed is a crack in the skin between the toes. Later there may be a general spread over the feet with reddened, scaly, weeping sores which may seriously incapacitate the patient.

There is no reason to think that these infections are derived in any way except by contact with a person who has the disease, or with clothing he has worn or articles he has used (but cats and dogs and some other animals sometimes have the same infection and doubtless can convey it to people). A common means of transmission is by way of the floors of gymnasia where people walk barefooted. Hence, the name "athlete's foot." Many gymnasia and swimming pools provide shallow basins containing disinfectants into which the users are required to dip their feet on entering and leaving the room. This device is probably of doubtful value since short exposure would not be likely to kill the spores, while strong solutions would injure the skin and make matters worse. It

would be better to inspect the feet of all those using the rooms and to exclude persons with significant sores until they had their feet treated. Treatment, while sometimes requiring some time for complete cure, is usually effective. Much can be done by the patient by means of strict cleanliness of the feet, washing with plenty of soap followed by thorough drying, and frequent changes of stockings.

Scalp ringworm often requires expert treatment, including the removal of the hair so that the skin can be thoroughly treated.

Diagnosis can be verified by microscopic examination of skin scrapings.

Rocky Mountain Spotted Fever

Only a very small proportion of the entire population of the United States lives in the Rocky Mountains. It may therefore seem unnecessary to include in this book a disease which from its name would be thought to affect only a restricted area. The truth is that although the disease was originally found only in the Rocky Mountains, it has since been found in a large number of States outside of that area, including some of those on the Atlantic coast.

This disease belongs to a rather large group of diseases, slightly different forms of which are found in many parts of the world, and which have something in common with that historic pestilence, typhus fever (which see).

Rocky Mountain spotted fever is apparently never communicated directly from one person to another, and is for that reason perhaps not to be classified as a communicable disease. One could attend a person afflicted with this disease without fear of catching it. The disease appears to be conveyed to human beings entirely by means of the bites of ticks. It is believed that these ticks have become infected originally by sucking the blood of some small wild animal which had the disease, but it is known that ticks can transmit the germs to their own progeny through the eggs, and thus keep up the infection for a long time without access to any other source.

Ticks are not, strictly speaking, insects, although they have the general appearance of "bugs." In the adult stage they have eight legs while true insects have but six. They are flat, leathery animals of slow-moving habits which attach themselves to grass, bushes and trees, waiting for some passing animal or man to give them a chance for a meal of blood. In feeding, they bury the mouth parts well down into the skin, and suck in enough blood to make them swell up into an object of the general size and shape of a bean. They accomplish this feeding so slowly and gently that a person may be quite unaware of their presence until, while bathing or combing the hair, he encounters this curious attached object. Ticks are very widely distributed throughout the United States, only a few areas being relatively free from them, but they always require woods, underbrush, or grass for their harborage and would seldom be found in well tilled fields.

The germ which causes Rocky Mountain spotted fever belongs to a small class of micro-organisms known as *Rickettsia*. Their exact classification is still uncertain. In the body they are found chiefly inside of the tissue cells. They can be removed from suspensions by laboratory filters, but cannot be grown as yet on artificial culture media. Recently they have been cultivated in living eggs and other tissues.

Between 3 and 10 days after being bitten by an infected tick the patient notices the first symptoms. There are fever, a peculiar rash on the skin, and considerable prostration. Fortunately, we have a laboratory aid to diagnosis in what is known as the Weil-Felix test. This is a test which is based on experience only, and the reason why it works in the typhus group of diseases is not known. A certain culture of bacteria (Proteus X) has the peculiar property of being agglutinated or clumped by the blood serum of patients suffering from these diseases.

An individual can avoid this disease by keeping from being bitten by ticks. If living in an area where cases of this disease have been noted, one should make systematic search for ticks on the body after going into the woods during the tick

season. Tick season is from the onset of warm weather in the spring to the middle of summer. It takes several hours for a tick to get down to the serious business of feeding so that inspection twice a day should be sufficient—at noon and before going to bed. Ticks should be removed preferably without touching them with the fingers and on no account should they be mashed between the fingers. Infections have been acquired in this way from ticks removed from dogs. Children should be carefully inspected by their elders if exposed to ticks.

People whose occupations expose them constantly to tick infestation, such as hunters and trappers, sheep herders, and surveyors, may secure at least partial and temporary protection by being inoculated with a vaccine. They are then much less likely to get the disease, or to suffer severely if attacked. This vaccine is prepared at present from infected ticks raised in the laboratory which act as so many little test tubes in which to grow the virus. As this is written, hopeful progress is being made in a project to prepare the vaccine by growing the virus in fertile hens' eggs and other living tissues. The preparation of vaccine by the present method involves the handling of infected ticks in large numbers. This new method if successful will avoid some of the dangers now incurred by laboratory workers in preparing it.

The public health method of attacking this disease, aside from furnishing the vaccine and warning the public about ticks, is to undertake campaigns against the ticks themselves; but when we think of the vast areas which are tick infested, the problem seems almost hopeless except for small local projects. Burning underbrush, killing off small animals, and dipping domestic animals in anti-tick liquids have all been tried with some success, but what the individual does to protect himself must remain the chief reliance for a long time to come.

Rubella (German Measles)

German measles is ordinarily such a mild disease that except for one fact it is probable that health departments would not waste much time or effort on it. This fact is that it often

resembles scarlet fever so closely in the early stages that it is necessary to investigate and determine which disease is really present. Unless cases were promptly notified to the health authorities, this could not be done and an outbreak of the more serious disease might get under way. By looking into all cases that resemble scarlet fever, a better control of that disease can be accomplished. The name is misleading—the disease has nothing to do with either Germans or measles.

German measles (the name rubella is seldom used) has a longer incubation period than either scarlet fever or measles, 2 or 3 weeks. After a short period of mild sore throat with some swelling of the lymphatic glands of the neck, a rash appears on the face which rapidly spreads over the body, fading in one place as it progresses to the next. The fever is usually slight and may be absent. The glands in the neck, below the ear and at the back of the head may be felt as tender hard bodies the size of a small pea, and are quite characteristic of this disease. Complications are rare and the patient gets well in a few days. The cause is unknown but will probably prove to be a filterable virus, judging from analogy with some other diseases. Cases are probably infectious to others from just before the rash appears to about a week after it fades. Cases should be reported, isolated, and treated by rest in bed. Articles used by patients should be disinfected, and the room cleaned and aired before reoccupation.

Rubeola (Measles)

The only reason for giving the Latin name for measles here is in order to be consistent throughout the book in giving the medical name first and the common name afterward. As a matter of fact the name rubeola is seldom used by any one at the present time.

The public really ought to know a great deal about measles since nearly everyone gets it sooner or later, and every family with children is likely to have an opportunity to observe it. But there are some things about measles which the public does not seem to have learned in spite of all its experience. This

illustrates the fact that even widespread experience may teach few lessons unless there is some agency for bringing this experience together, analyzing it, and publishing the results. This of course has been done in the case of measles by the vital statistics bureaus of health organizations, and by the studies made by the medical profession.

The most important fact derived from these studies and statistics is that measles is a dangerous disease. In general it is true that the younger the person the greater is the danger. Children under 3 years of age are especially likely to have fatal complications, usually in the form of pneumonia, and every effort should be made to protect them from infection and from complications. Fortunately, in addition to the general measures of keeping the children away from contact with cases of the disease, we have a very effective means of protection in convalescent serum. This is the blood serum of a person who has just recovered from measles. If this is not to be had at the time, the serum (or whole blood) from any one who has had measles some time ago may be used, but more of it is necessary. If these substances are injected into a child who has been in contact with a case of measles, within the first 4 or 5 days after such exposure, the attack is very likely to be averted. Even if given somewhat later it makes the attack much lighter and less dangerous. In the first case the child receives only a passive immunity which lasts for a few weeks. If a mild attack occurs (as in the second case), the immunity is active and probably lasts throughout life (see discussion of immunity under Diphtheria). Naturally the serum has to be collected and administered with certain medical precautions.

Measles is now believed to be due to a filterable virus, but the complications are caused mostly by streptococci and other bacteria. The incubation period (time between exposure and first symptoms) is usually 8 to 10 days.

The first symptoms may easily be confused with those of an ordinary cold. Exposed persons should be carefully watched. They should be immediately isolated if the symptoms are found. The eyes become red and weeping and sensitive to

light. The nose runs. The throat may be sore, and coughing and sneezing develop. At this time peculiar small spots form on the inside of the mouth (Koplik's spots) which have a bluish center surrounded by a red patch. To the doctor they are a sure sign of measles. There is some fever at this period, but it usually declines after a day or two and one may think that the trouble is all over. However, usually on the fourth day from the beginning of symptoms, the fever increases and may become very high and the patient breaks out into a skin rash which soon spreads over the entire body and the disease is clear to anybody who has seen a few cases. The patient can infect others at any time from the beginning of the first symptoms (the first slight rise of temperature or running of the eyes and nose) until the rash subsides, which it does in about 5 days. As the rash goes away the outer layers of the skin are cast off in the form of small bran-like scales, leaving healthy but at first somewhat darkened skin.

There is at present no recognized specific treatment for measles, but much can be done to make the patient more comfortable and to prevent complications. The eyes and ears should be cared for and fever reduced if very high by sponging. Measles is spread by the respiratory route (droplets, etc.) and by articles soiled by the patient. It is a very pervasive infection, however, and probably can be carried on the clothing of a visitor for a short time, although the germs do not live long outside of the body. Thorough cleaning, sunning, and airing of the sickroom should be carried out before occupation by nonimmune persons.

Children who have been exposed on a known date may be allowed to attend school for the first week after such exposure since they cannot convey the infection during that time. Then they should be kept by themselves under close observation until 15 days after exposure. During epidemics little children should be most carefully kept away from visitors. Fortunately, this disease does not appear to produce chronic carriers who go about spreading the infection (contrast with Poliomyelitis, which see).

Scarlatina (Scarlet Fever)

Scarlet fever is always a serious disease and the reporting of every case should be required. For though the outbreaks have in general been much milder during recent years than they formerly were, and the death rate from this disease has been much reduced, still severe cases may crop up at any time. Serious complications are not infrequent even after mild cases.

By pointing out some differences between scarlet fever and measles (which has already been discussed) we can give a brief picture of the former. Scarlet fever has a shorter incubation period than measles, usually only 3 or 4 (2–7) days. While the running eyes and nose are early signs of measles, in scarlet fever sore throat is complained of, and there is apt to be vomiting and high fever at the start. There is no remission of symptoms as in measles, but the rash appears on the first or second day. This rash is less blotchy than that of measles, more of a uniform bright redness, and it may spread all over the body excepting the face (which is attacked in measles) or sometimes occurs in patches. It usually lasts 4 or 5 days, and after it has faded, some time in the second week, the skin begins to "peel." Instead of the branny scales of measles, there are larger patches of dried outer skin. In the early stages there may be an eruption on the roof of the mouth which may give a strong hint to a doctor, but soon the tongue shows changes which are more distinctive. The red papillae show through the coated surface giving the appearance of a strawberry. The lymphatic glands of the neck are apt to be swollen but not usually to the extent that they are in German measles.

In the cases in which a strong toxin is produced by the cocci, or in which the patient is unusually susceptible, the patient may be very ill from the disease itself, but in the majority of cases nowadays the chief trouble comes from the complications. The principal complications are: Inflammation of the inner parts of the ears, which frequently leads to deafness; inflammation of the kidneys, which may be serious

but usually subsides; inflammation of joints; and lastly a form of heart disease.

After the rash and fever disappear the patient may feel so well that he wants to get up and work or play as usual. This is a very dangerous thing to do, both for the patient himself and for others. Any exertion at this time is apt to throw extra strain on the heart and kidneys which may result in serious damage. The danger to others comes from the fact that the disease is still transmissible after the patient feels entirely well. Usually an isolation period of 3 weeks is required by health officers—or longer when there are discharges from the ears or other sores.

The cause of scarlet fever is a streptococcus, a kind of bacteria which have the form of a chain of beads. There are many kinds of streptococci, only to be told from each other by laboratory tests. The scarlet fever streptococci belong to the group called "hemolytic" because they can dissolve the coloring matter of blood which is used in the artificial medium on which these germs are cultivated. They are closely related to the germs which cause erysipelas, septic sore throat, and some other diseases.

These streptococci are carried from person to person by contact. They can live on fabrics and articles somewhat longer than many germs, and it is not rare for visitors and others to convey the infection. They also grow well in milk, and milk-borne epidemics are not rare. Pasteurizing all market milk prevents this danger.

The control of this disease depends upon: (1) Early diagnosis and reporting; (2) the isolation of all recognized cases; (3) preventing people who have been in contact with the patient from mingling with others until 7 days after such contact (which is long enough to determine whether they are going to become ill or not); (4) disinfecting discharges from the patient and articles soiled by him; (5) disinfecting the sick room when it is vacated; (6) supervising food handlers and pasteurizing milk.

Both a preventive and a cure for scarlet fever have been prepared by laboratory means. The preventive consists of a toxin

made from the streptococci. Small quantities injected at intervals will prevent subsequent infection in the great majority of instances. Whether the person has been immunized or not can be determined by the Dick test, which consists of injecting a tiny drop of the same substance into the skin, similarly to the use of the Schick test in the case of diphtheria. This means of prevention is sometimes employed in institutions where an epidemic of scarlet fever would be a very serious matter, but is not yet recommended for the general public.

The cure mentioned above consists of an antitoxic serum obtained from horses or other animals which have been immunized by injecting them with the products of the streptococci over a long period. Its use is at present confined to the severe "toxic" cases, since the mild cases do not require it.

Convalescent serum (see Measles) also may be used in this disease.

Septic Sore Throat

In the preceding section on scarlet fever it was stated that the cause of that disease was a streptococcus closely related to the germs which cause some other diseases, among them septic sore throat. Some scientists believe that the differences which we observe in the symptoms of these various diseases are due to differences in the way the germ attacks. For example, in cases which have mild throat symptoms but an abundant rash, we would call it scarlet fever, while in those with violent throat symptoms and little or no rash, we would call it septic sore throat. For the present, however, it is convenient to describe them as separate diseases, bearing in mind their close relationship. All of them have a tendency for the germs to get into the blood stream (septicemia), with the production of chills and high fever, and the constant danger that the germs will be deposited and grow in some important organ where the blood has carried them.

In the case of septic sore throat, the tonsils and neighboring parts of the throat are particularly attacked and very serious

damage to these structures may follow, but the chief danger lies in the sepsis which often accompanies the disease.

The disease may be carried directly from one person to another, thus causing a few cases in the vicinity. It more commonly appears in the form of epidemics which are caused by unpasteurized milk. The milk is usually infected in one of two ways. A milker who has the disease or is a carrier of the germs adds them to the milk in the process of drawing or handling it. Or he may infect the udder or teats of the cow, producing an inflammatory condition which furnishes streptococci in the milk in large numbers and often for a long time.

The germs are thus of human origin. Very similar cocci may be found in inflammations of the cow's udder which are not of human origin and which do not cause septic sore throat. The bacteriological diagnosis is therefore a matter of very accurate laboratory work. A health officer cannot wait for the completion of such tests, however. As soon as a number of cases of violent sore throat are reported to him he will immediately begin checking up on the milk supply.

In a typical epidemic all the cases will be found to be supplied from the same dairy, and the houses supplied by other dairies will be skipped by the infection. Moreover, the milk which causes the trouble will not be pasteurized milk. Studies at the suspected dairy will usually reveal the source of the infection, either in a milker with sore throat or sores on his hands, or in lumps or sores in the udder of one or more cows. The health officer will then stop the delivery of milk from that dairy until the infection has been cleared up, the cow or person removed, or the whole supply continuously pasteurized.

It seems probable at the present writing that sulfanilamide or some related drug may prove to be effective in the treatment of these cases.

Syphilis

Syphilis is caused by a germ known as the *Spirochaeta pallida*. It is acquired through close contact with a person

who has the disease. An expectant mother who has syphilis may transmit it to her unborn child. The germ which causes syphilis needs warmth and moisture for its growth and preservation, and for this reason it does not live for any great length of time when deposited on inanimate objects. In the early stages of syphilis the discharges from sores on the skin and mucous membranes of infected persons contain many of the organisms. A well person might possibly acquire the disease through coming into close contact with articles recently soiled with such discharges. It may also result from kissing if the infected person has sores on the lips or in the mouth, and is occasionally acquired accidentally by doctors, dentists, and nurses, in connection with the professional care of infected persons. However, due to the biologic nature of the *Spirochaeta pallida*, the transmission of acquired syphilis occurs chiefly through sexual intercourse.

The first sign of syphilis is a sore appearing at the place where the spirochete entered the body. This sore does not develop immediately but may occur from 10 days to 6 weeks after contact. It may be a small pimple or a small ulcer. It is not very painful and runs a course ordinarily lasting from 3 to 8 weeks. This is the so-called seronegative stage, for the blood test does not become positive until 10 days to 6 weeks after the appearance of the chancre. The diagnosis can, however, be made readily in any good laboratory by what is known as the darkfield test, which shows the spirochete as a squirming, corkscrew-like organism under the microscope. If adequate treatment is begun at this time and continued at regular weekly intervals for a period of 18 months to 2 years, a cure can be obtained in 86 percent of all cases. If treatment is delayed only a few weeks until the blood test becomes positive, the chances of cure decrease to an average of 80 percent.

The primary sore, or chancre, heals with or without treatment in from 3 to 8 weeks and the disease progresses to what is known as the second stage. This is often characterized by skin eruptions which may resemble measles, a food rash, or a mild case of chickenpox. This rash may or may not be

accompanied by falling hair, fever, sores in the mouth, headaches, or indigestion. In one man out of every five, and in one woman out of three, all of these symptoms are so mild that they pass unnoticed. During this stage, however, the blood test is positive, and if it were used routinely as a part of every physical examination, many unsuspected cases would be disclosed.

The signs and symptoms of this second stage also disappear after a few weeks even though no treatment is received. The disease then enters what is known as the quiet or latent stage. During this period, there are no symptoms other than the positive blood test, but the spirochete is active. It produces slow but harmful changes in body structures which may lead to very serious difficulties in later life. The best of treatment during this stage produces a permanent satisfactory result in only about one-half of such cases.

In its late stages syphilis can simulate almost every disease known to physicians, and for this reason Doctor Osler called it "the great imitator." Among the more serious of these late effects is damage of the heart and great blood vessels, and of the brain and spinal cord. Treatment in this late stage can accomplish nothing more than relief from symptoms. The disease has produced destructive changes in important body structures which no amount of treatment can restore to normal.

The infectiousness of syphilis decreases with the duration of the disease. The primary sore, or chancre, and the sores in the mouth, which occur usually during the second stage, contain many organisms and are highly infectious. In untreated cases, such infectious sores may recur at intervals during the first 3 years, and in some cases during the first 5 years of the disease. After this period syphilis is probably not transmissible through casual contact. However, proper treatment with the arsphenamines, which are compounds of arsenic with other chemicals, will quickly render an early case noninfectious, thus preventing the spread of the disease from a sufferer to other persons.

Anyone may acquire syphilis. There is no natural or acquired immunity or protection against this disease. Unlike some other communicable diseases, one attack of syphilis and recovery from the disease does not protect the individual against subsequent infection. Syphilis is widespread in all regions of the world. It is no respecter of race, creed, or color. The age of greatest incidence is between 16 and 30 years. In the United States approximately 100,000 individuals between the ages of 11 and 20 acquire syphilis each year, and approximately 250,000 acquire syphilis before the age of 25 is attained. Syphilis occurs in small epidemics. The only source of this disease is the infected individual. The control of syphilis consists essentially in breaking the chain at its weakest link—the early case. The diagnosis of syphilis is easily made as soon as it becomes infectious. By treatment with the arsphenamines we can render each case noninfectious. From a public health standpoint, therefore, it is our definite responsibility to treat each case promptly; to render that case, its source, and all contacts noninfectious; and to treat all syphilitic pregnant women, for we can absolutely prevent transmission of the disease from mother to child.

Public health officers, private physicians, and social workers cannot bring about the control of syphilis without full approval and loyal support of the general public. Everyone should know the facts about this dangerous disease; its cause; the manner in which it is spread; how to avoid it; and the importance of early and adequate treatment. When every man and woman and every boy and girl acquire this knowledge, and all good citizens unite in a declaration of war against this dreadful enemy, we can reach our goal—to lift the shadow of syphilis from the land.

Tetanus (Lockjaw)

It is questionable whether lockjaw should be included among the communicable diseases, since its conveyance from one person to another must be a very rare occurrence. There

is ordinarily no danger of infection from attendance upon a case of lockjaw.

Tetanus is a wound infection. The wound may be slight and superficial, but the greatest danger is from deep, punctured or torn wounds and those into which bits of soiled clothing or dirt have been driven during the injury. Wounds with pus in them which are tightly covered with improper surgical dressings that prevent drainage, shut off all air, and restrict circulation, are favorable for the growth of tetanus germs. Tetanus has followed vaccination for smallpox in a very small proportion of cases, but only when dressings of this kind had been applied.

Tetanus is due to the toxin or poison produced by *Bacillus* (or *Clostridium*) *tetani*. This a rod-like bacillus which makes sure of its perpetuation by producing a very resistant spore at one end, which gives it a very characteristic "drum-stick" appearance. It is a typical anaerobic bacillus, which means that it grows best only when air has been excluded. The presence of oxygen prevents its reproduction. In growing it in test tubes in the laboratory, air must be excluded from the tube by one or another means, and better growth occurs if a piece of meat is dropped into the culture medium. We now see why deep, lacerated, and tightly covered wounds predispose to tetanus.

The tetanus bacillus may be found in the soil almost anywhere in nature. It is a normal inhabitant of the intestinal tracts of many kinds of animals, and a large proportion of human beings carry it around with them all the time in their intestines. The soil of manured fields is particularly rich in this bacillus. If this be true, one may reasonably ask why everybody does not have tetanus sooner or later. The answer is that it is the toxin of tetanus and not the bacillus itself which causes disease. The toxin must come in contact with nerves to cause the trouble. This cannot happen as long as the bacillus remains outside of the tissues. Wounds are necessary to allow the bacillus to produce the toxin where it can get at the nerves. A few cases of lockjaw have been reported

where no external wound could be found, but there was probably an internal wound or ulcer to explain these cases.

Gunshot injuries are ideal for the production of tetanus, because the tissues are apt to be torn, the wounds deep and foreign substances driven in. For this reason, lockjaw was formerly very common in war.

Fourth of July celebrations are always followed by cases of tetanus because of the kind of injuries inflicted by the various explosives used on such occasions. The blank cartridge with its clay wadding has been a great offender. Of recent years there has been some reduction in these accidents because of the warnings always issued by the health departments at that time of the year, and the propaganda for a safe and sane Fourth.

Tetanus is a painful and very frequently fatal disease, involving the nervous system principally (compare with Botulism). Lockjaw is an almost constant symptom. The muscles of the jaw become tightly contracted so that the mouth cannot be opened. Very painful convulsions often occur. The breathing muscles are finally affected in fatal cases.

The incubation period is very variable, sometimes as short as four days following the injury, sometimes three weeks or more. The longer the incubation period in general, the milder the case is apt to be, and the better the chances of recovery are.

Health officials cannot do much to prevent tetanus beyond informing the public of its causes and urging the avoidance of unnecessary wounds (as on Fourth of July) and advising prompt treatment. But the individual himself, or in the case of children the parents, and the physician to whom they apply, can do much to prevent it when wounds have occurred. The first aid treatment of all wounds is essential. No wound is so slight as not to require it. But wounds of the sort here described need especial attention. Some of them require immediate surgery with opening up of deep wounds and removal of destroyed tissue.

There is one measure which is an almost sure preventive of tetanus if it is administered just after the wound is received, and this is the injection of tetanus antitoxin. During the World War there were extremely few cases of tetanus among the American soldiers because practically all the wounded received antitoxin as soon as they could be reached. The antitoxin is prepared like diphtheria antitoxin by injecting horses with successive doses of toxin and using the blood serum after the animals become highly immune. The usual dose for prevention is 1,500 units.

The tetanus which has rarely followed vaccination must be especially mentioned because the fear of it may prevent people from having their children vaccinated, and then we shall have more smallpox (which see). In the first place it must be stated that although thorough search has been made, the tetanus bacillus has never been found in smallpox virus, even in the same material used for the cases which developed tetanus. The second fact is that in all the reported cases improper dressings had been applied to the arm. A properly performed vaccination (as described under Smallpox) requires no dressing, and in fact is much better off without any.

After symptoms have developed, antitoxin is the best form of treatment. But it is not nearly as good a treatment as it is a preventive. In medical and public health work an ounce of prevention is worth a ton of cure.

Trachoma

Trachoma is a communicable eye disease which shows little tendency to spread among people living under average American conditions. It is not rare and may be very common among certain groups, especially recently arrived immigrant families from the Mediterranean area, the inhabitants of certain sparsely settled mountainous districts, and some tribes of Indians. A rigid inspection of immigrants both at European ports of embarkation and on arrival in America has practically eliminated the first source, while the other two groups have

received special medical attention which has greatly improved conditions.

The cause of trachoma, although it has been intensively sought for by capable bacteriologists, cannot be said to have been discovered at the present time. The disease seems to be favored by unusual exposure to wind, dust, and sun, and by careless habits of personal cleanliness and the use of the same towel by several or many people—"the common towel."

Trachoma first attacks the conjunctiva (the membrane lining the eyelids) causing granulations to form which thicken the lid and irritate the eyeball. Later on these granulations are replaced by scar tissue which contracts, deforming the lids and bending them inwards so that the eyelashes may rub against the front of the eye. The irritation thus caused is not only very painful but is commonly followed by partial or complete blindness.

Treatment of trachoma is necessarily prolonged, but cure is possible and the prevention of further eye damage is to be expected.

The secretions from the nose and eyes of sufferers should be disinfected, and the patients trained in habits of strict personal cleanliness, including the use of personal towels, and treatment should be started as soon as possible. Patients should be under surveillance of the health department and not permitted to mix with healthy people until health authorities are satisfied that they are no longer dangerous.

Common towels should not be tolerated anywhere.

Trichinosis

This disease is not communicable from person to person. It is communicable from hogs to people, but only after the hogs have been killed and the pork or pork products eaten uncooked or undercooked, except in the case of products processed under Federal meat regulations. The animal parasite, *Trichinella spiralis*, which causes this disease occurs in the muscles of infested hogs. When the flesh of the hog is eaten without

sufficient cooking to kill the parasites, the latter develop in the body of the consumer and cause the disease.

The symptoms of trichinosis are often vague and easily confused with other conditions, and it is certain that many cases occur without ever being recognized. However, pains in the muscles of different parts of the body, with puffiness of the face and eyelids, more or less severe digestive disturbance, and weakness, should lead a doctor to suspect this disease, especially if the patient has recently eaten raw or insufficiently cooked pork. If then the doctor examines the blood microscopically, as is so commonly done to assist the diagnosis of many diseases, he will be very unlikely to find the parasites. They are seldom there in large numbers or for a long time. But he will be quite likely to detect eosinophilia, which for some reason often occurs in cases of trichinosis. This should make him still more suspicious. Eosinophil cells are a variety of white blood corpuscles, which are present in only a small percentage in normal blood, but are greatly increased in numbers in cases of trichinosis and some other conditions.

Sometimes, as in the country, where the carcasses of farm-killed hogs are kept for some time during the winter, it is possible to examine some of the remaining meat, and find the parasites in it. Another way to identify the disease is to snip out a tiny portion of the painful muscles of the patient, and examine that under the microscope. Fortunately, we now have two other tests, recently improved, which make the diagnosis almost certain. One consists of injecting a small amount of trichina antigen into the skin and looking for a red reaction; the other is a precipitin test performed with a small amount of the patient's serum placed in contact with the antigen.

Trichinosis may be quite a mild condition, but many cases are severe and some are fatal.

Unfortunately, a very considerable proportion of hogs in this country have the *Trichinella* in their bodies, and the only safe rule to avoid the disease is always to cook pork very thoroughly before eating it. Roasts or other thick cuts should be cooked

for at least a half hour for each pound of meat, and in any case until the flesh becomes white, not pink. Pork sausages and other products are sometimes eaten without cooking, such as in sandwich fillers. This is a dangerous practice unless these products have been inspected and passed by the Bureau of Animal Industry or other approved agency.

The *Trichinella* is an interesting little round worm, which is seldom seen in the adult stage since it is hidden in the mucous membrane of the intestine. The larvae are produced in large numbers in the intestine. From there they are carried all over the body by the blood. *Trichinella* are too small to be seen by the naked eye. But when they arrive in the muscles they coil up into a spiral and become covered with a sort of capsule, forming a so-called "cyst." The "cyst" may be as much as one-fiftieth of an inch long, and is barely visible. Under even a low power microscope cysts are readily seen in bits of muscle which have been flattened out between two glass slides. They look like small transparent lemons, each containing a coiled-up spring.

Hogs most commonly become infested with trichinae through a kind of involuntary cannibalism. That is, they are fed on garbage which contains among other things, scraps of uncooked pork or other parts of slaughtered hogs. This is all very nice for the *Trichinellae*, which are thus assured of comfortable homes for their children and grandchildren, but it is bad for the hogs and for the people who eat undercooked pork. This could all be prevented by cooking the garbage before feeding it to the hogs.

The Government efforts to prevent trichinosis by inspection are necessarily very limited. Pork, which is customarily cooked, is not inspected nor subjected to any process to kill trichinae. Some of the pork products which are frequently eaten without cooking, such as the dry summer sausages, are subjected to processing to make them safe. Only such products as bear the Government stamp of approval (or that of some other acceptable agency), may be safely eaten without cooking.

The prevention of trichinosis in hogs can be slowly effected

by making and enforcing regulations to prevent the feeding of these animals with uncooked garbage, but it will apparently be a long time before this is generally accomplished. In the meantime, the prevention of the disease among people will remain largely a matter of individual precaution.

Tuberculosis

Forty years ago tuberculosis was the chief single cause of death. Now it is number seven on the list of causes of death. Not only have the recognized cases of tuberculosis been greatly reduced, proportionately to the population, but the death rate among recognized cases has been remarkably diminished. At the same time the methods of diagnosis have been greatly improved, so that cases are discovered now in the early stages which would formerly have escaped detection until they became much further advanced. Tuberculosis is still, however, one of the most important of all diseases, a great source of suffering and disability, and the cause of something like twice the number of deaths caused by automobile accidents.

Tuberculosis occurs in two principal forms: (1) Lung tuberculosis, formerly known as "consumption," which is due to the human type of the tubercle bacillus. (2) Tuberculosis of the bones, glands, skin, and some other tissues, which may be due to the human type, but is frequently caused by the bovine type. These two types are very similar, but, as their names indicate, one is particularly adapted to human beings, while the other is the ordinary cause of tuberculosis among cattle. The distinction is important because the methods of prevention are different. The human type is carried from person to person, chiefly by means of sputum or things soiled with it, while the bovine type is carried from cows to people through unpasteurized milk.

The tubercle bacillus (*Bacillus*, or *Mycobacterium*, *tuberculosis*) is a peculiar rod-shaped microscopic plant which belongs to the group known as "acid fast." They are called "acid fast" because when they have been stained with dyes so as to be recognized under the microscope, the color cannot be washed

out with dilute acids—the dye is "fast." This simple fact has been largely responsible for the successful study of many phases of tuberculosis. It narrows the search for tubercle bacilli down to consideration of only a few other germs which might be confused with it, but which are readily separated by other characters. Tubercle bacilli grow slowly on artificial culture media, and in some of these which are fluid, they produce a substance which is known when purified and standardized as tuberculin.

When first prepared, many years ago, it was hoped that tuberculin would prove to be a universal cure for tuberculosis. This hope has not been realized, and tuberculin is relatively little used at present in treatment. It is, however, of some value in diagnosis, and in discovering how widely tuberculous infection is distributed through a population. With the newer preparations and using them as skin tests, it is possible to test a great many people in a short time with very little inconvenience to them. A positive result, however, does not give much information as to the activity of the tuberculous process or the extent of damage to the lungs. It merely signifies that the bacillus has gained a lodgment in the body. Since at least half of all adults may be expected to give a positive reaction, it is plainly no cause for alarm. It should, however, lead to more thorough examination by other means, including an X-ray of the chest, especially when found in children. The examination of sputum for the tubercle bacilli is another test which should not be omitted when the disease is suspected.

It is one of the great discoveries of modern times that tuberculosis is curable in the great majority of cases provided proper and early treatment can be secured. This treatment makes little use of drugs, but lays the greatest stress on rest, fresh air, good food, moderate exercise, and other hygienic habits of life, all adapted to the individual patient by a physician skilled in this line of practice. For the majority of people, this treatment is best secured at a sanatorium where all the facilities and the experience are at hand. The patient

is also taught how to avoid being a danger to other people.

While the tubercle bacillus is the one indispensable cause of tuberculosis, its mere presence in the body is often harmless unless the infected person becomes "run down" either by some other disease or by improper habits of living.

Tuberculosis is very often contracted in childhood from living in a house where there is a person who has the disease in an active form and who scatters the germs about by careless habits. In a few children the disease may run a rapidly fatal course, but in the majority it may cause few symptoms or even go unrecognized. Later in life the mental and physical strains to which the person becomes subjected, or possibly some acute disease, may so lower the resistance to infection that tuberculosis flares up again, and these later attacks are apt to be more serious than those of childhood.

Tuberculosis is therefore one of the most powerful arguments for a sane and hygienic mode of life. The opportunities for infection are many and hardly to be avoided during a lifetime. Keeping the general health at its best all the time is the best preventive. It is true that many poor people do not have the ability to keep in the best of health. They must work very hard, worry much, and live in crowded quarters. But they are not the only sufferers from tuberculosis. Young people in the most favored circumstances often develop the disease quite unnecessarily by their incessant activities in the pursuit of pleasure. A continual round of parties, dances, unhealthful foods and drinks, and loss of sleep, rest, and healthful outdoor exercise are just as bad as those conditions to which the poor people are exposed.

The prevention of lung tuberculosis is largely a matter of keeping persons who are liberating the bacilli from allowing them to get to other people. Very sick persons cannot take these precautions and are preferably removed to an institution until they get better. Others not so ill can be trained to avoid spreading the bacteria by coughing or other habits, and to dispose of the sputum safely. Children should not be exposed to cases of tuberculosis. Either they or the infected

person should be removed from the household. Refractory patients must be handled by the health department.

For the prevention of bovine tuberculosis, a determined attempt is being made to rid the herds of cattle of this disease, but this will be a long time job before it is complete. In the meantime, unheated milk must be regarded as dangerous for this and many other reasons. Boiling or pasteurizing the milk satisfactorily avoids this danger.

Tularaemia

This disease is rarely if ever carried from one person to another. It is acquired from one or another form of wild animal in one of two ways: (1) Directly, by handling the carcass of the animal or eating the undercooked flesh; (2) indirectly, by being bitten by an insect which has previously fed on a diseased animal.

The wild animals which most frequently suffer from tularaemia are rabbits, but many other kinds of wild animals have been found infected or susceptible to the disease. The commonest history of a human case is that the person has handled the carcass of a rabbit in the process of preparing it for cooking. Thus, hunters, butchers, cooks and housewives are commonly attacked. Since sick rabbits and other animals are more easily shot or caught than well ones, it is not a rare thing to see a person infected in this way. The insect transmission of the disease is not so common except in a few localities. A biting fly, known as the deer-fly, and certain kinds of ticks are the most common carriers.

In tularaemia there is usually a sore at the place where the infection entered the body, on the hands from dressing the rabbit, or on any exposed place where the insect did its biting. These sores are frequently quite extensive, much swollen, discolored and ulcerated, and the nearby lymph glands are enlarged and may suppurate. At the same time the patient has fever and may become much prostrated. One out of about twenty patients dies.

The cause of tularaemia is *Bacterium tularense*, a very small bacillus which grows in different forms, either rod-shaped or rounded. It requires special media for its cultivation. In an infected animal it produces peculiar spots in the spleen, liver and bone marrow, with enlargement and suppuration of the lymph glands.

The diagnosis of tularaemia is aided by agglutination tests. In these tests some of the patient's blood serum is mixed with a suspension of known tularaemia bacilli. Another test is to inoculate a guinea pig with material from the sores, and observe the effects on the internal organs.

The prevention of tularaemia is almost entirely a matter of personal precaution. Sick or dead wild animals which are found should not be handled. It is best to wear rubber gloves while skinning or dressing wild game, especially rabbits. Any carcasses in which peculiar whitish spots are found on both liver and spleen should be discarded and buried or burned, and the person's hands should be washed and disinfected at once if they have been soiled. The bacillus of tularaemia does not require a wound for its entry, but can go through the healthy skin. Sometimes infection is contracted by rubbing the eyes with soiled fingers.

The incubation period of this disease is from 1 to 10 days, usually about 3 days. If 10 days have passed since a suspected exposure without any symptoms, the danger may be regarded as passed.

Recovery from tularaemia is followed by permanent immunity, although small sores may form on the skin at places which are reinfected. There is no specific treatment. Patients are usually laid up for several weeks with this disease, but, as indicated before, most of them ultimately recover.

Typhoid Fever

No other disease has shown so much reduction in the number of people attacked and killed by it during the past 25 years as has typhoid fever. In the large cities especially,

it has become so rare that only 1 or 2 persons out of 100,000 may die of it during a year, whereas formerly there were scores. In small towns and villages, however, and in country districts, the improvement, while great, has not been what it should be. The reason for this difference is that most large cities have set up good health offices with sanitary control of water and milk supplies, while in many smaller places these improvements have lagged behind.

In this way it happens that people who go from the cities in the summertime to find health and recreation in small towns and the open country run more risk of getting typhoid fever (and some other diseases) than if they had remained at home. "Summer people" in the country should use their influence to have health conditions improved in the places which they visit. They often own cottages there on which they pay taxes, and they always spend money locally, and are entitled to demand reasonable health protection.

The cause of typhoid fever is the typhoid bacillus (*Eberthella typhi*, or *typhosa*), a typical rod-shaped bacterium which moves about rapidly by means of lash-like flagella attached to its outside all the way around. It is readily cultivated artificially and from the cultures a vaccine may be prepared which is highly protective when injected under the skin.

The final source of infection is a patient sick with typhoid who liberates the bacilli in the discharges from his body, principally the feces and urine. He may continue to liberate them after he recovers, even for many years, and thus becomes a chronic "carrier," always a source of danger to other people unless he is most careful in his personal habits. Carriers may also develop without having had a recognized attack of typhoid fever. There are four principal ways in which the bacilli get from a case or a carrier to healthy people and thus infect them: (1) By immediate contact, such as shaking hands or kissing; (2) through drinking water which has become contaminated, as for example, that of wells located near privies, or unpurified public supplies fed by surface waters; (3) through drinking milk which has become contaminated

by carriers employed in the dairy, using contaminated water to rinse utensils and other easily imagined ways; (4) by flies which alternate their visits to the privy and the kitchen and carry the bacilli on their legs and bodies. Other ways of transfer can readily be thought of, such as through oysters grown in polluted water. The bacilli do not live long in the outer world when they are subjected to sunlight and drying, but in moist warm surroundings they not only live but may also multiply, as they do for example in milk.

Typhoid fever has an incubation period after exposure which may vary from 3 to 38 days, but the average is about 10 days. The symptoms come on slowly, and for a week the patient may simply feel "out of sorts" with a little fever, headache or dullness, and feeling of fatigue. Then the fever begins to mount, there may be some abdominal pain and tenderness, diarrhea or constipation, great weakness, and mental confusion. A moderate cough is common in the early stages. As the disease progresses, the patient loses flesh and frequently sinks into an unconscious or delirious state. The eruption on the skin consists of small rose-colored spots, mostly on the abdomen, and there may be few or many. The disease usually lasts 3 or 4 weeks and recovery is gradual. Death occurs in about 10 percent of cases on the average.

The diagnosis of typhoid fever is aided by several laboratory procedures. In the first week, the bacilli may be cultivated from the patient's blood. The feces and urine may also be examined for them. Later on the blood serum gives the Widal reaction. This is the agglutination reaction similar to that used in many other diseases. When the serum is mixed with a suspension of known typhoid bacilli the latter lose their motion and are drawn together into clumps. This can be seen under the microscope, or when the test is done in a test tube the clumps can be seen to fall slowly to the bottom, leaving a clear fluid above.

The control of this disease depends upon the early recognition and reporting of all cases, and the immediate search for the sources of the patients' infection, so that other cases may

be prevented. All discharges from the patient must be scrupulously disinfected at the bedside. The patient must be isolated and attended only by nurses or physicians, and this is best done in a hospital. The patient must not be released until tests have shown that the bacteria are no longer being liberated. When carriers develop they must be educated in the prevention of the transfer of the infection, if attempts to cure them fail, as they frequently do. They must not be allowed to work in food establishments or dairies, and in fact should be under the surveillance of the health department until the condition clears up.

General measures are of the greatest usefulness and have been the principal cause of the great reduction of typhoid fever. Undoubtedly, the chief of these is the provision of safe water supplies. The sanitation of milk supplies is also of great importance, and should be supplemented by the pasteurization of all market milk. Control of shellfish growing and shipment is carried out by the State and Federal Governments. In the country, campaigns for the safe disposal of body wastes by constructing sanitary fly-proof privies, and for the protection of wells and springs from contamination have done much good, but the whole country has not been reached by them.

Typhoid vaccine is principally useful among large organized bodies of men, like soldiers, who must live for a time, at least, under insanitary conditions, or in populations exposed to special hazards on account of floods, earthquakes, and other disasters where sanitary arrangements have become disorganized, and among people who travel much in poorly sanitated areas. For the general population it is generally regarded as unnecessary. There is no specific cure for this disease.

Typhus Fever

In the chapter on Rocky Mountain spotted fever, it was pointed out that there are throughout the world a number of closely related diseases which resemble each other sufficiently to be included in a group known as the "typhus" group.

The chief points of resemblance of these diseases are: (1) That they are caused by a group of germs different from known bacteria, called *Rickettsiae;* (2) that they are transmitted only by biting insects (or other jointed-legged "bugs"); (3) that besides man, other animals, chiefly small rodents, are infected and thus serve to keep the disease alive; (4) that they have a peculiar skin eruption consisting of red spots which do not fade out when pressed with the finger; (5) that they come on quickly and that recovery, when it occurs, also takes place rapidly; (6) that they commonly respond to the Weil-Felix test. (See Rocky Mountain Spotted Fever.)

One form of this disease has been known for centuries. This is now known as European typhus fever. It is the "jail fever, camp fever, or ship fever" of the older writers, and, as these names indicate, it was prevalent where many people were crowded together in close quarters. We now know that the reason for this prevalence was the simple fact that these people were lousy, for the common body louse is the known transmitter of this form. This has been a very deadly disease, and from 20 to 40 percent of its victims have died in some epidemics. Epidemics of European typhus fever have occurred in the United States, but it is doubtful if there have been any cases here during recent years except some which have entered this country from Mexico. It is possible that its absence here may be explained by a lessened prevalence of body lice in this country. These outbreaks were most severe during the winter time, either because the lice do not thrive in warm weather or because winter clothing gave them more protection. A mild form of typhus has been observed in some of our large cities, and is known as Brill's disease.

The above mentioned forms of typhus need not concern us greatly in the United States, unless for some unforeseen cause our populations should become highly louse infested. This, of course, could happen if our standards of living and cleanliness should be changed for the worse. The Federal Government maintains a quarantine against the introduction of typhus fever from foreign countries.

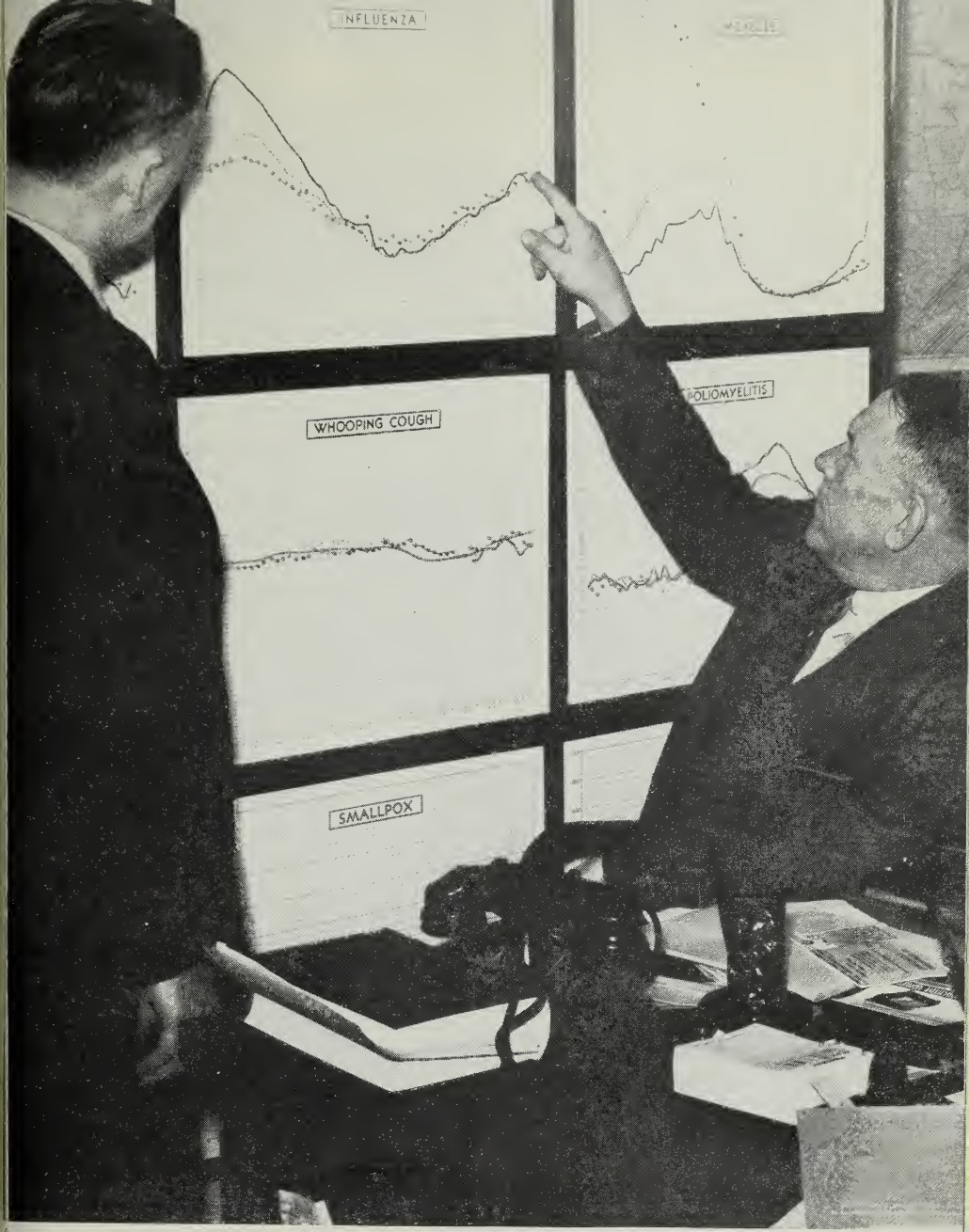
There is another form of typhus fever in the United States which has not been recognized for very many years, and which does not ordinarily occur in the form of epidemics. For this reason, it is referred to as "endemic typhus fever." In contrast to the louse-carried typhus it occurs chiefly in the warmer months, and it is carried by fleas which in turn get the disease from rats.

Endemic typhus fever may turn up anywhere where rats live, provided of course that the rats are infected. Many cases have been seen among people who worked in the market districts of cities where rats abound on account of the abundant scraps of food and the convenient places where they can burrow and hide. The death rate in this disease has thus far been very low, only about 2 percent.

The prevention of endemic typhus fever is a matter of avoiding flea bites and getting rid of rats. Rats are very destructive animals which cost the country large sums of money by their depredations. It would be well worth while to get rid of them on this account alone. They can be "built out" by constructing markets, warehouses, barns, chicken houses, etc., in such a way that the rats have no places in which to breed and hide. The prompt and efficient disposal of waste food, and clearing up of rubbish heaps and dumps, also discourage their prevalence. With the rats gone there would be fewer fleas, and so far as we know, those that were left would not be infected with the typhus fever germs.

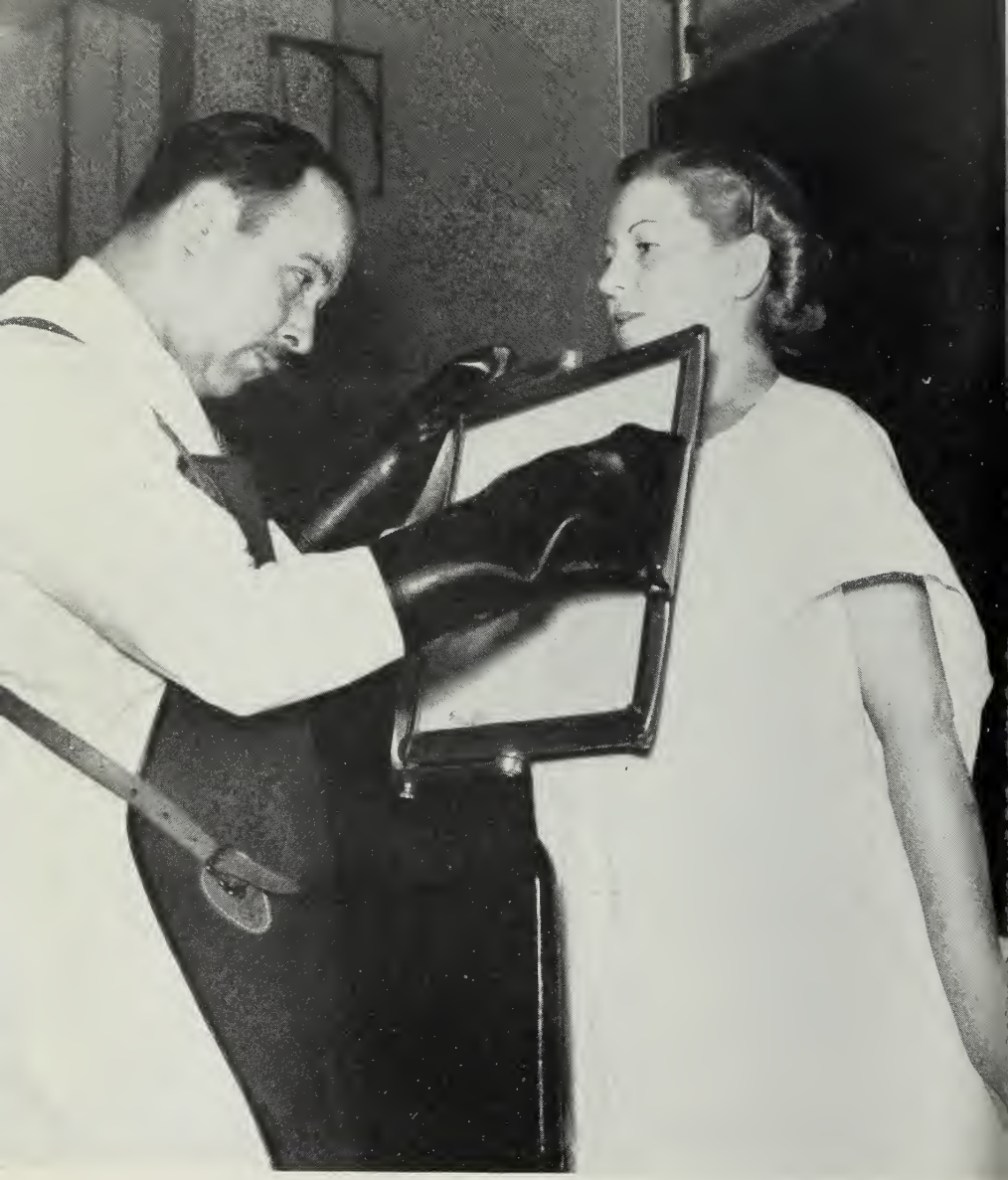
Varicella (Chickenpox)

Chickenpox is easily spread. Everybody who has not already had the disease is so susceptible to it that 9 out of 10 children have had an attack by the time they are 15 years old. It is therefore rare after that age, and cases which resemble it are always regarded with suspicion by the health authorities, who fear that it may really be smallpox, a much more dreaded disease. It is chiefly because of the danger of confusion with smallpox that it is important to report all cases of chickenpox.



HE FIGHT FOR HEALTH IS EXPENSIVE

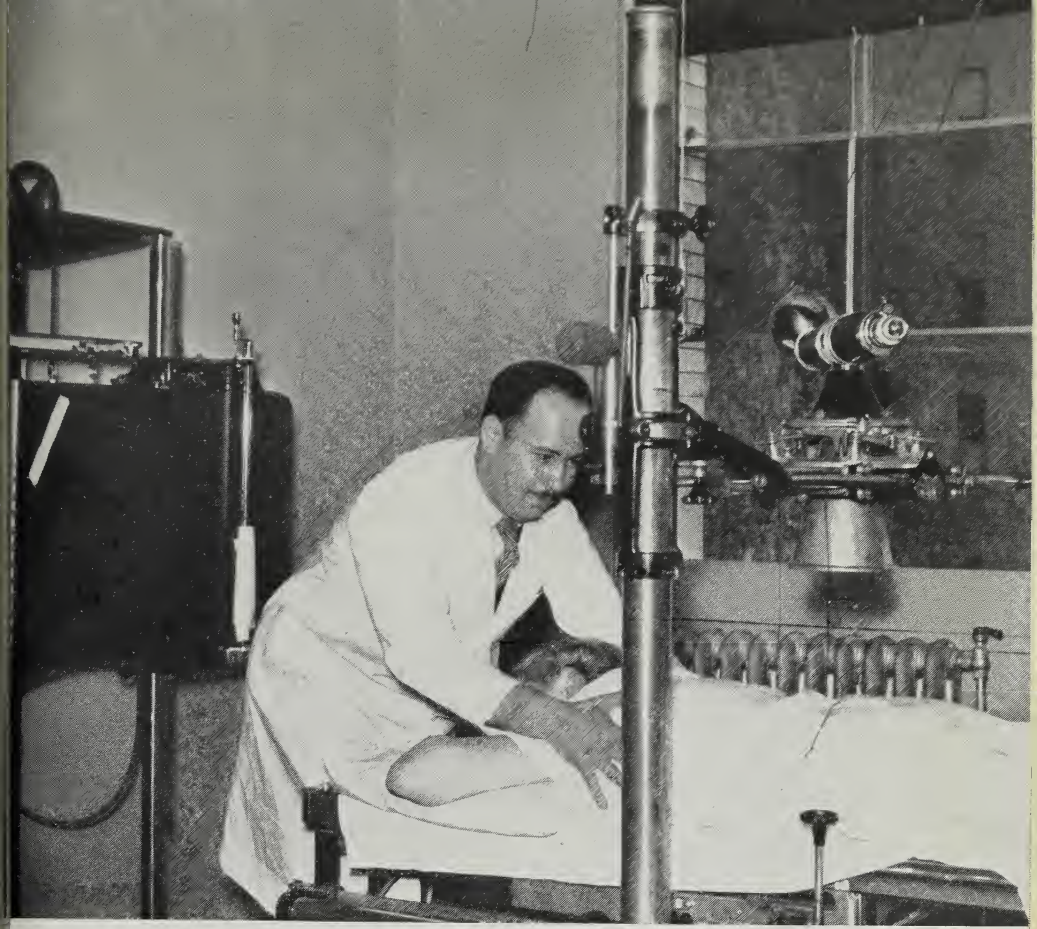
inking citizens are appalled by e toll taken by diseases known to preventable or curable. The th is that though modern scientific search has developed highly effec- e weapons, *they cost money.* Most communities are forced to carry on their fight for life with weapons long since obsolete. Only an aroused public opinion can institute a national health program to reduce our losses from disease and death.

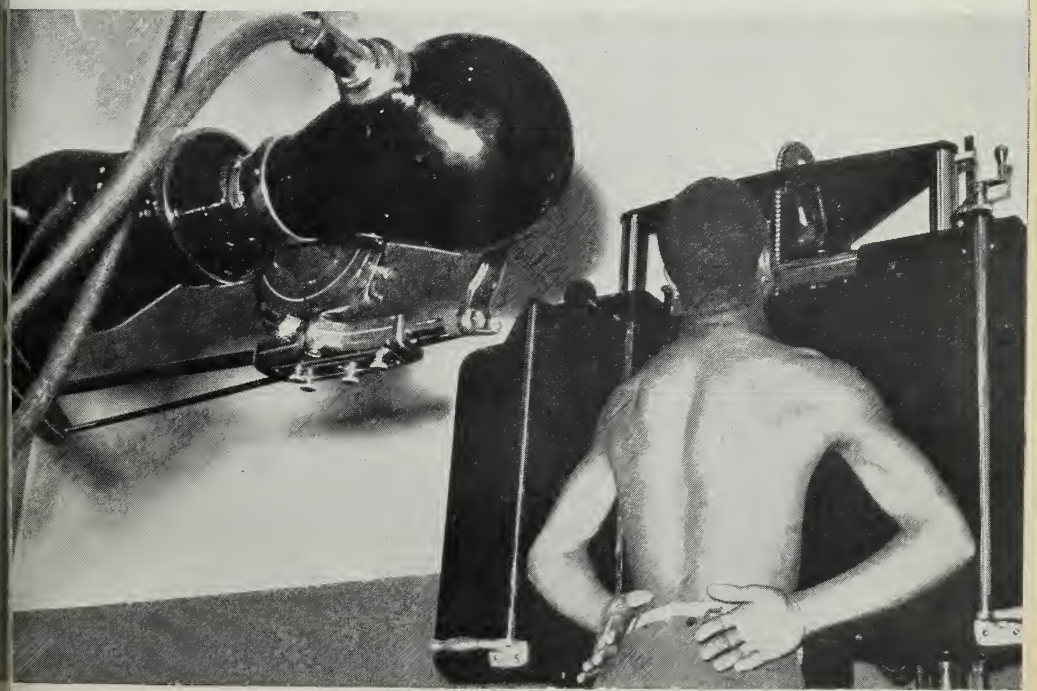


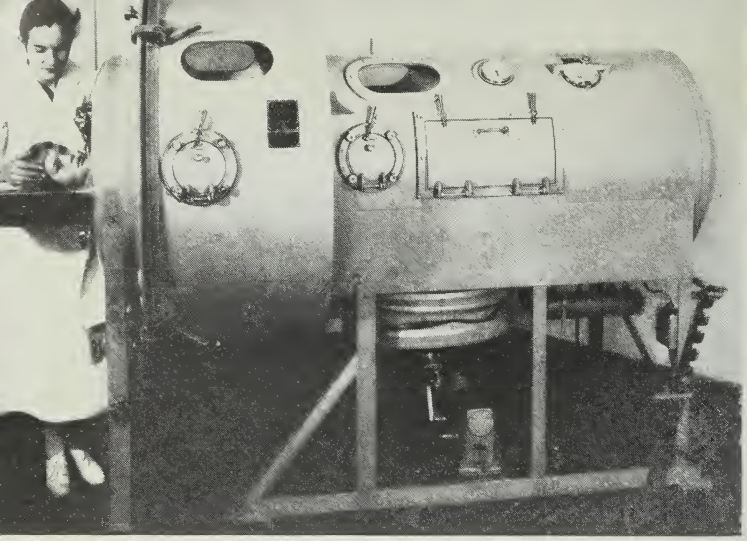
Though the X-ray is invaluable in the diagnosis and treatment of many diseases, it performs its greatest service in detecting our arch-enemy . . . tuberculosis.

The X-ray can *see* tuberculosis long before the stethoscope can *hear* it. But X-ray prints are costly and patients put off having them taken. The time to catch tuberculosis is in the earliest stages when the victim is hardly aware of its presence. Even in cold figures, adequate com munity X-ray facilities pay for them selves many times over, for sooner o later a large percentage of tuber culosis patients become the tax payer's responsibility.

The fluoroscope (above) is a essential part of X-ray equipment On its screen is revealed the throat lungs, heart, and gastro-intestina tract *in action* . . . an invaluable service in examining any patient.



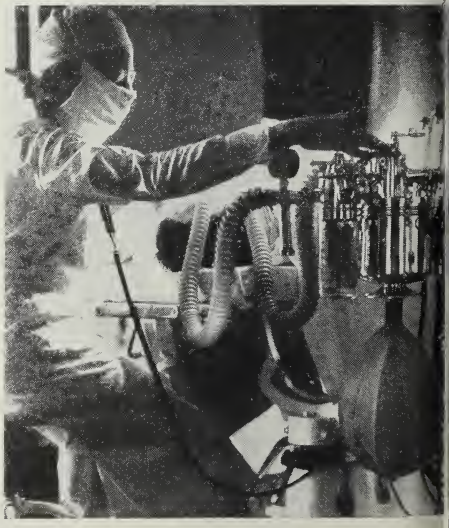




W. P. A.

The iron lung is
device equipped wi
suction pumps f
the production
continuous artifici
respiration in p
tients whose breat
ing muscles ha
been paralyzed.
has saved the liv
of many infanti
paralysis victims.

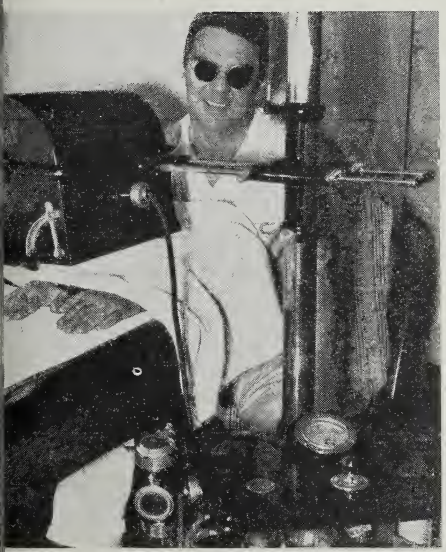
The Kettering Hypertherm, or fever box, is a newly perfected weapon against syphilis, gonorrhea, arthritis, and several other diseases. In its air-conditioned chamber the body temperature may be raised to 105 degrees or more.



Sterilization and anesthesia are the cornerstones of modern hospital practice. In communicable disease work sterilization is doubly importan
Proper equipment costs a lot of mone
but is absolutely indispensable.

ıe urgent need in most communi-
s is for adequate isolation quarters
r communicable disease patients.
› patient should be in a position to
read disease by direct contact or
rough coughing and sneezing.

There should be facilities for attend. ants to sterilize their hands and equipment and to change gowns before moving from one bed to another. Even in some large communities facilities are inadequate.



LIFE

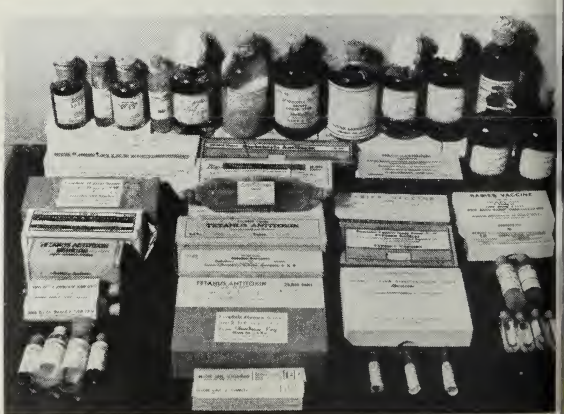
odern physical therapy requires
n endless array of heat, light, and
athermy machines, baths, cabi-
ets, exercisers, and many other
evices. Only when used by
rge numbers of people is such
quipment economically feasible.

Another remarkable but expensive health weapon is the blood transfusion. With its aid, many a patient has been pulled through what might have been a fatal illness. All too often lack of a properly stocked "blood bank" or inability to pay has cost a human life.

The modern trailer clin is the latest means of brin ing medical facilities rural areas which here fore have been cut off fr all such advantages. T United States Public Hea Service is making effecti use of such trailers.

The oxygen tent is a device increasing the concentration oxygen. It is essential in t treatment of pneumonia a other diseases in which t effective lung capacity is se ously reduced.

Progress is made every year in the development of antitoxins and vaccines which prevent or cure some of our deadliest diseases. But they are usually extremely costly. To make them available to everyone, several States produce the common types in their own laboratories.



ont line of every major medical vance is the research laboratory. ten overlooked by a public at- acted to the clinical phases of dicine, research work has been far too dependent upon uncertain charity and beneficence for support. Recognizing that sound research progress demands free hands unhampered by financial insecurity,

progressive citizens are insisting upon strong public support for this field of medicine. Convinced that nothing compares in value with a human life, they point out that b ancing the *human* budget is, af all, the first responsibility of a progressive community or nation.

The cause of chickenpox is believed to be a filterable virus which is transmitted both through secretions from the upper air passages and by means of the crusts which form on the skin sores.

Chickenpox has a long incubation period—2 or 3 weeks. There are very few general symptoms, and aside from slight fever the only sign of the disease may be the skin eruption. This consists of successive crops of small red spots which soon form raised blebs at their centers, which contain a clear fluid. The blebs soon burst and dry up, forming scabs. These sores form mostly on the body, with a few on the face and frequently some on the scalp. Unless they are scratched and infected with other germs they do not leave any scars or pits. Practically no deaths occur from this disease.

Patients suffering from chickenpox should be put to bed for a few days and kept away from other persons who have not had the disease until the scabs have disappeared from the skin. Their secretions and all articles used by them should be disinfected in the sick room. After recovery, the patient is usually immune to further attacks of chickenpox for life. The name chickenpox does not imply any connection of the disease with chickens.

Variola (Smallpox)

If we could only go back 200 years and move about among the people of that time, we should gain a good object lesson in smallpox. Almost every adult person whom we met would have at least a few scars or pits on the face showing that he had had the disease, and many would be terribly disfigured. There would be many people blind in one or both eyes as the result of smallpox. Everyone would have had some friend or relative dead of smallpox. When they spoke of the beauty of some lady in those days they added, "and she is hardly pitted with the smallpox at all."

There are two reasons for the difference regarding smallpox in those days and in our times. The principal one is that since the time of Edward Jenner (1796) we have had a simple

and sure means of preventing smallpox—vaccination, which has been employed to a great extent among the people. The other but less important reason is that in recent years we have been able to keep people infected with severe smallpox away from unprotected people fairly promptly. Therefore, only the mild forms of the disease have spread their infection very widely in this country. Nevertheless, very severe epidemics have occurred in some localities during that time, and we can never tell when such virulent forms will crop up. It is interesting to reflect that we could have gone around among the populations of 200 years ago without the slightest danger of getting smallpox ourselves provided we had been properly vaccinated.

The only reason why it is necessary to write this article on smallpox at this late day is that many people do not keep themselves properly vaccinated, and that as a consequence cases of this disease continue to occur. Some people do not believe in vaccination, while others are merely careless about it. They and their children are, of course, the chief sufferers. But if there are many of them in a community, they may spread the infection and become a menace to the partially protected part of the population. It must be clearly recognized that a single vaccination in infancy does not guarantee full protection for life. In fact, statistics indicate that in about half of such persons, protection has become entirely lost at the age of 21. Proper vaccination, therefore, means repeated vaccination, in infancy, on entering school, and at intervals during later life.

Typical cases of smallpox and chickenpox can readily be distinguished, but sometimes a mild case of the former and a severe case of the latter offer difficulties to the most experienced doctors. In such cases the safe course is to act as if the case were smallpox. In contrast to the mild general symptoms of chickenpox, those of smallpox are usually severe, with fever, aches in the head, back, or abdomen, and prostration. The eruption is usually deferred until the third day, and the spots feel hard instead of soft as they do in the case of chickenpox,

because they are much deeper down in the skin. During the week following their appearance the spots first become capped with vesicles (small clear blebs), then the fluid becomes yellowish pus, and finally these burst and scabs form. These sores attack the face first, and to a greater extent than do those of chickenpox, and may cause blindness by attacking the eyes. In severe epidemics, such as still occur occasionally in this country, the death rate may be very high, but in the usual run of cases nowadays it is low. Severe cases may be contracted from mild ones so that every precaution should be taken.

The incubation period of smallpox is usually between 8 and 16 days, so that unprotected persons are not out of danger until at least 16 days following exposure.

Smallpox is very readily transmitted and this occurs through the secretions of the nose and throat even before the spots have come out on the skin, and later through particles which are thrown off by the skin. Infection may occur at some distance from the patient. These facts make it necessary to take the utmost precautions in isolating the patient and disinfecting everything coming from him, all articles used by him, and the sick room after it is vacated. This can best be carried out at a contagious disease hospital.

Vaccination (from vacca, a cow) was the first form of artificial protection by inoculation to be applied by mankind, if we except the direct inoculation of smallpox material itself, which is believed to have been an ancient practice. It was introduced long before people had any knowledge of bacterial causes of disease or immunity, and resulted from observations of farmers and dairymaids that those who had had an attack of cowpox could not acquire smallpox.

Vaccination as practiced nowadays consists of inoculating a small portion of cowpox lymph preserved in glycerin into the surface of the skin. A good method is known as the "lateral pressure" method, in which a needle is held parallel with the surface and pressed down through a drop of the lymph against the skin several times in a square about an eighth of an inch on a side. This causes no bleeding and is practically painless.

The resulting vaccination is small, and the scar consists of a single small pit. No dressing whatever should be applied to the vaccinated place. It is a cause of sore arms. If some moisture is produced after a few days, a piece of sterile gauze may be pinned to the inside of the sleeve, but nothing should be attached to the arm.

When a person who is still immune is revaccinated, there will be no regular "take"—only a small red spot which soon fades out, the "immune reaction." If the person is not still immune, a regular or modified "take" will occur.

Vincent's Infection (Trench mouth)

This is an infection of the mucous membranes of the mouth and throat, and more rarely of other parts of the body. It came into prominence during the World War and was commonly known as "trench mouth." It produces ulcerations and a whitish membrane which may resemble that of diphtheria. It has a tendency to last a long time unless properly treated. The lymphatic glands in the neck are apt to become swollen, and there may be mild fever and other general symptoms. Ordinarily, however, the patient is not very sick.

The disease is believed to be caused by a peculiar bacillus (*Bacillus fusiformis*), which is broad in the middle and tapers toward each end. A spirochete (*Spirochaeta vincenti*) having a few coarse waves throughout its length is frequently found associated with the bacillus in the sores. Whether these are two different forms of the same germ, or whether they are different germs which work together to cause the disease has not generally become agreed upon. They are both frequently found in apparently healthy mouths, but in smaller numbers than when the disease is present. This leads to the belief that many people are healthy carriers. It is known also that poor nutrition and other conditions which tend to impair the general health favor the development of the disease.

Vincent's infection is apparently not highly communicable, but under certain conditions may spread rapidly, especially where dishes are not thoroughly cleaned with plenty of hot

water, and where people are careless about the common use of personal articles. Prevention consists of attention to these hygienic matters, and taking measures to improve the general health, especially by providing a proper diet. The preparations of arsenic which are used in the treatment of syphilis often effect a rapid cure of Vincent's infection when applied directly to the sores in the form of a powder. This might be taken as evidence that the spirochete of Vincent plays an essential part in causing Vincent's infection.

Yellow Fever

Yellow fever was formerly a terrible scourge in the United States and many thousands of our citizens died of it. When an epidemic occurred, large numbers of people would flee from the stricken area until they were stopped, often by men with shotguns, at the borders of areas which were still free from the disease. Business and travel were completely disorganized.

For one excellent reason these epidemics were usually confined to the Southern States. This reason, as we now know, was that the particular kind of mosquito which carried the disease could only breed extensively in a warm climate. Occasionally, enough infected mosquitoes would be carried in the summer time to more northern places (Philadelphia, for example) to start and maintain an epidemic during the hot months.

Yellow fever gets its name from the fact that most of the patients develop a degree of jaundice or yellow color of the skin and mucous membranes during their illness. High fever, great prostration, and vomiting also occur. The death rate is usually very high. In places where yellow fever occurred every year, practically all the grown people who lived there had had the disease and were immune, so that the children were the chief sufferers. The disease, however, was usually much milder in children. The populations of these places had therefore adjusted themselves somewhat to this infection, but visitors from other places were almost sure to get the

disease, and ships would carry it to other places and infect them.

The discovery in 1898 that yellow fever was carried by certain mosquitoes (*Aëdes aegypti*) led immediately to the means of controlling the disease. All that was necessary was to prevent the breeding of these pests. This was comparatively easy to do because the *Aëdes* have the peculiar habit of breeding in artificial containers near dwellings, rather than in extensive swamps as do many other kinds.

The final cause of yellow fever is a filterable virus. This circulates in the blood of the patient during the first 3 or 4 days of illness, and mosquitoes can become infected only during that time. Then the germ must undergo changes inside of the mosquito for about 12 days before a bite will infect another person.

Up to a very few years ago, health officials generally believed that it would be only a short time before yellow fever would be completely vanquished, and banished from the earth. Some newer developments, however, have made them doubt that prophecy. One of these is that a form of yellow fever has been discovered in some of the remote areas of South America, which appears to be carried by some means other than the *Aëdes* mosquito. Just what that means is has not been determined. It is also suspected that some animal other than man may be susceptible to the disease in these areas, and serve to keep the infection alive. This "jungle fever" may therefore act as a continual threat to places which have been free from or freed from yellow fever. The other new circumstance is the increase of airplane transportation, which connects in a few hours places which were formerly days or even weeks apart. The possibility of carrying infected mosquitoes or persons by this means is seriously considered by health authorities and measures to prevent it are already being applied, but their success will have to be tested by time and experience.

GLOSSARY

Agglutination: The stopping of motion and clumping together of bacteria when they are exposed to the action of the blood serum of a patient who has or has had infection with that same kind of bacteria. Or, employed in the opposite direction, the same effect on bacteria taken from a patient, with the serum of an animal immunized with the same kind of bacteria. Useful in the diagnosis of a number of diseases.

Allergy, allergic: These terms relate to an abnormal condition of sensitiveness to substances which are not irritating to the majority of people. Hay fever (not a communicable disease) is an example, in which the allergic persons suffer severely on breathing in certain plant pollens.

Anemia: In general terms, an impoverished condition of the blood, of which different types are recognized.

Antibody: A characteristic constituent of the blood and fluids of the immune animal, antagonistic to the harmful action of bacteria. Examples: Antitoxins, agglutinins, precipitins.

Antigen: A substance which, when injected into the body of a person or animal, leads to the production by the body of antibodies, which are chemical substances antagonistic in some way to the antigen. Bacteria and toxins frequently act as antigens.

Antiseptic: A substance (liquid, powder, or salve) which is unfavorable to the growth of germs. It does not necessarily kill the germs. Substances used to kill germs are called germicides or disinfectants.

Antitoxin: A substance which has the property of neutralizing the injurious factors of toxins. Since antitoxins are produced in living bodies of man or animals, and are dissolved

in the blood, their source is the serum of the blood, from which they have not yet been completely separated.

Bacilli: Bacteria which have the form of straight rods.

Bacteria: Microscopic plants consisting of single cells which reproduce by splitting in two. Bacteria include *bacilli* which are rod-shaped, *cocci* which are spherical, and *spirilla* which are curved. Bacteria which cause disease are called *pathogenic*, others which live in the body without doing harm are called *saprophytic*. Many bacteria in nature are helpful to man or at least not harmful.

Carrier: A person or animal which harbors disease germs and liberates them continuously or intermittently so that they may infect others. The term signifies that this condition lasts for more than a few days. Healthy carriers are those who have not had symptoms of the disease, or who have completely recovered.

Cocci: Bacteria which have the form of spheres or little balls.

Conjunctiva: The membrane that lines the eyelids and covers the eyeball in front.

Contact: While this means, strictly speaking, actually touching the patient, it is commonly used to include being in the presence of the patient—near enough, for example, to be infected by droplets or other air-borne particles.

Convalescence: The period during which a patient is recovering from a disease, but has not yet regained full health.

Cultivation (of bacteria): Growing the germs artificially in the laboratory on specially prepared substances, either liquid or solid, which furnish the required food and other necessary factors.

Defecation: The act of discharging feces.

Diagnosis: The identification of a disease by medical methods. Distinguishing the disease which a patient has from other diseases which might be confused with it.

Disease: A general term for any departure from health. When such a departure conforms to a well recognized pattern of

symptoms and signs, or when the final cause is definitely known, it becomes a disease, as cholera or malaria. The term disease is not commonly applied to conditions immediately due to injuries, such as broken legs, or drowning.

Disinfection: Measures taken to destroy disease germs. These vary greatly with conditions, materials, etc. Rooms, floors, walls, furniture, and the like, were formerly subjected to gaseous disinfection, and still may be under special conditions, but ordinarily thorough scrubbing with soap and water, and exposure to sunlight and dry fresh air are sufficient. Boiling or steaming is useful for fabrics, dishes, and the like. The doctor or health officer should prescribe methods for dealing with the discharges from the patient's body.

Droplet infection: A common means of transmitting diseases of the respiratory tract, and other diseases which enter the body through the mouth and nose. In speaking, coughing, sneezing, and laughing, the patient throws out droplets of saliva or sputum containing the germs. These may be projected to a distance of several feet and thus, in a moist and fresh condition ideal for causing infection, reach the mucous membranes of the nose and throat of another person.

Endemic (usually used as an adjective before *disease*): The prevalence of disease in an area at the customary or expected rate. This rate, as in the case of tuberculosis, may be much higher than that which would constitute an epidemic of some other disease.

Epidemic: An epidemic is the occurrence of a disease in unusually large numbers of persons at about the same time and place. Compare *Endemic*, *Pandemic*.

Fallopian tubes: Tubes in the female through which the ova pass from the ovaries to the uterus.

Feces: The discharges from the bowels.

Fever: An elevation of the body temperature above the normal of 98.6° Fahrenheit or 37° Centigrade.

Flagella: Hair-like projections attached to the outside of some kinds of bacteria, which serve as organs of locomotion.

Generative organs: The organs concerned in the reproduction of species, chiefly the penis, seminal vesicles, and testicles in the male; the vagina, uterus and ovaries in the female.

Genito-urinary: Pertaining to the generative and urinary organs.

Germ: This homely term is used throughout this book to stand for the cumbersome name *pathogenic micro-organism*. It refers to any disease-producing living agent of microscopic (or ultramicroscopic) size.

Hygiene: The science and art of healthful living. The term is usually employed to cover what an individual can do to protect and improve his own health, not by taking drugs and medicines, but by proper personal habits. "Public hygiene" covers what communities can do for the health of their inhabitants.

Immunity: A condition in which a person or other living thing is partially or wholly resistent to some infectious disease. See discussion under *Diphtheria*.

Incubation period: The interval between the entrance of an infecting germ into the body and the first signs or symptoms of disease. It varies in different diseases from a few hours to several months, and when it can be definitely measured is often an aid to diagnosis. Used only in connection with infectious diseases.

Infection, infectious: These terms refer to diseases which are caused by germs which produce their effects after being admitted to the body. Botulism (which see) is therefore not an infection. Neither is lead poisoning. Diphtheria and typhoid fever are infections or infectious diseases.

Infested: This term is commonly used to describe the presence of the larger animal parasites in the body, while *infected* is

used for vegetable parasites or microscopic animals. The distinction is based on the reaction of the body, but is not always clear cut.

Inflammation: A more or less localized reaction of the body tissues to the influence of injurious agents, the classical signs and symptoms of which are pain, heat, redness, swelling, and disturbed function.

Inoculation: The introduction, either accidentally or by intent, of the virus of a disease into the living body. Done intentionally as a preventive measure, as in the vaccination of persons to prevent smallpox.

Isolation: Keeping a patient away from other persons whom he might infect, and allowing him to be attended only by nurses or physicians or persons who are immune to the disease. Also used in the case of persons who have been exposed to a disease, either for the longest incubation period of that disease, or for that portion of it during which they might transmit the infection.

-itis: A suffix used to indicate inflammation of the organ or tissue whose name precedes it.

Media: The term used to denote the substances on or in which germs are artificially cultivated. They consist of various broths or jellies containing appropriate foods and chemicals for each kind of germ. They are sterilized before use to prevent the growth of undesired kinds.

Micro-organism: A living thing (plant or animal) which is so small that it can be seen only through a microscope.

Ova: Plural of ovum, see ovum.

Ovary: Female sexual gland in which the ova are formed.

Ovum: An egg, the female reproductive cell.

Pandemic: A pandemic is the practically universal prevalence of a disease beyond the usual rate. Example, the pandemic of influenza in 1918 which spread over the whole world in a short time.

Parasite: An animal or plant which lives on or in another

animal or plant at the expense of the latter for food. Some are practically harmless, while others cause disease.

Pasteurization: The process of destroying germs by heating the liquid in which they are suspended to just a sufficient temperature and for a sufficient time to kill the pathogenic forms with the exception of spores, with a small excess allowance for safety, followed by rapid cooling to a temperature below that at which spores will develop. As applied to milk it has the advantages over boiling that it does not affect taste or the separation of cream, or cause significant chemical changes. A standard temperature is 142° Fahrenheit for 30 minutes, or by another process, 160° for 1 minute. The milk should then be cooled to 50° or below and kept cool until used.

Penis: The male sexual organ which forms the external end of the sexual and urinary systems.

Precipitin: An antibody occurring in serum and manifested by a cloudiness which forms when a corresponding antigen is added to it in a test tube.

Privy: Used in this book to mean a toilet not connected with a sewer. Usually a small separate outhouse.

Prostate gland: The gland surrounding the urethra next to the urinary bladder in the male.

Quarantine: Originally meant holding infected ships in harbor for 40 (quarante) days before permitting the passengers to land. They are now held only for the incubation period, unless new cases occur or carriers are discovered. As applied to persons or houses on shore, it means the prevention of contact with or visiting of any unauthorized persons during the specified period. Also only authorized persons are allowed to leave the house.

Reporting: As applied to public health, means the notification of the health department when cases of certain diseases are recognized. The list of reportable diseases varies slightly

in different places, but always includes infections which the health department must attempt to check.

Schick test: A test performed on a person's skin to find out whether or not he is immune to diphtheria (see Diphtheria).

Scrotum: A pouch of skin which contains the testicles and hangs below and behind the penis.

Semen: The fluid which contains the spermatozoa produced by the testicles.

Seminal vesicles: Sacs which act as reservoirs for the semen.

Serum: The fluid which separates from blood outside of the body after it has clotted. Immune serums are those derived from persons or animals which have been rendered immune to a disease either naturally or artificially. The word is often used incorrectly and ridiculously by the public to describe almost anything which is injected with a needle in the treatment or prevention of disease, including vaccines and drugs.

Sewage: The contents of a sewer, which may consist merely of surface water, or contain the liquid wastes of homes and other buildings and of factories. To be distinguished from *sewerage* which means a system of sewer pipes.

Specific: As an adjective, a term much used in medicine to indicate a close causal relationship. A specific drug, for example, is one which attacks the cause of the disease, and hence effects a complete and permanent cure.

Spermatozoa: Plural of spermatozoon, see spermatozoon.

Spermatozoon: The male sperm cell which fertilizes the ovum in the female.

Spirilla: Bacteria which have the form of curved rods.

Suspension: A liquid containing solid, undissolved particles (such as bacteria) which are so small that they sink toward the bottom only very slowly if at all.

Symptoms: Strictly speaking, the manifestations of disease which the patient himself notices and complains of, as distinguished from *signs* which are detected by the doctor.

Pain, for example is a symptom, but fever as shown by the thermometer is a sign. The word is often loosely used to denote all the evidences of disease.

Testicle: A gland situated in the scrotum. It produces spermatozoa and some internal secretions.

Toxin: A general medical term for any poison, but used here to mean the particular poisons which are produced by certain bacteria during their growth either in the body or outside of it, as in foods or in artificial culture media.

Toxin-antitoxin: A properly balanced mixture of these two substances prepared in laboratories and used to immunize persons against certain diseases. The antitoxin prevents ill effects from the toxin which, however, is still able to induce immunity. Diphtheria toxin-antitoxin has largely been superseded by toxoid.

Toxoid: A bacterial toxin which has been robbed of its injurious properties by chemical treatment while retaining its ability to induce immunity. Diphtheria toxoid is now largely used for immunizing children against diphtheria.

Urethra: The tube through which the urine passes from the bladder to the outside.

Uterus: The womb, a hollow, muscular organ in the lower part of the abdomen in which the fertilized egg develops into a child.

Vaccines: The first vaccine was smallpox vaccine, and its name is logical since the material was derived from a cow (Latin, vacca). Other substances are now called vaccines because their purpose or mode of action is similar to that of the original though applied to other diseases. But their preparation and method of using is usually entirely different. Bacterial vaccines are liquid suspensions of killed bacteria which have been grown in glass containers.

Vagina: The canal in the female which leads from the uterus to the external surface of the body.

Virulence: As applied to germs this means ability to produce

severe disease. Thus, certain strains of bacteria are said to have lost their virulence, if they now fail to produce severe infections such as they formerly did, although they may still be able to live and grow in the body.

Virus: As a general term this means any living cause of an infectious disease, or the materials which contain this cause. In a more restricted meaning it signifies the germs (or germ-containing material) which are known to exist as causes of certain diseases, but which have not as yet been seen or cultivated. The term is used loosely to refer to filterable viruses, which are too small to be seen definitely with the microscope, and which pass through the pores of filters which will hold back bacteria.

Suggestions to Teachers for Utilizing the Material

As stated in the introduction, this publication should prove useful for purposes of instruction in high schools and colleges. Some health educators have questioned the advisability of introducing the subject of disease into the curriculum on the ground that we should teach only "positive health," whatever is meant by that expression. The same issue was raised (with much more reason) a hundred years ago. Communicable diseases are very positive realities and we do not avoid them or help others to escape them by ostrich-like tactics.

For his first readings, perhaps, the student should be referred to some of the better known diseases such as he, himself, has experienced or some disease which, at the time, is of special public interest. This material is presented with the hope that a taste may lead to a considerable consumption. Where it is used as the basis of instruction it can be supplemented from other sources. With the help of a biology department specimens of micro-organisms can be demonstrated. Their shapes, dimensions, and rate of reproduction may be illustrated, leading to those more essential items—the conditions under which they flourish or perish and the methods and means of their transfer from person to person. For a course in biology this publication could be used as supplementary reading.

The contrast in what can be seen with and without a microscope points back to the long period of unaided vision with the theories of disease evolved from the imagination. This, in turn, leads to the role of bacteria in history. The decimation of conquering armies, such as that of Sennacherib, opens the pages of literature—of the Bible and Byron; the probable connection of communicable disease with the fate of Greece and

Rome can be brought out; the Black Death and other plagues of Europe were described by Pepys and Defoe; the accounts of epidemics of yellow fever in America are not dissimilar and they suggest the triumphs of sanitation in the building of the Panama Canal.

It is difficult to write of communicable diseases without using language which is more or less technical. There may need to be a liberal use of the glossary and of the dictionary. A search for the derivation of words often leads to interesting discoveries.

A study by the student of statistics of mortality and morbidity and their graphic presentation is illuminating. Such statistics are obtainable from the Bureau of the Census, the Public Health Service, and insurance companies. Death rates for a disease may be plotted for a period of years. It might be pointed out that such a disease as whooping cough, too often considered of little consequence, takes a large toll of life annually. Where the weekly reports of the United States Public Health Service are available, data concerning diseases in other countries will be of interest.

A list might be compiled of men of genius who were lost to the world prematurely by communicable disease. In this connection it could be emphasized that thousands of school children and adults now living have survived communicable disease but carry with them the scars of the experience in the way of damaged eyes, deafened ears, leaking hearts, and crippled limbs.

The care taken in a zoo to protect the primates from infection has an interesting bearing not only on the relative lack of care often displayed toward our fellows, but also with reference to the matter of immunity which is carefully described in these pages. It has been estimated recently that the death rate from tuberculosis among these animals is 10,000 per 100,000, or 200 times more than the rate for humans.

The activities of local departments of public health in the prevention of communicable disease may be studied. The responsibility of the physician and nurse who care for a case can be emphasized and especially the need for cooperation of a patient and his family.

There is always the danger, in a detailed and "integrated" study of such a subject, of losing sight of the essentials to be learned: (a) The student's own responsibility in the prevention of communicable disease; and (b) how he can help in this prevention. For the final lessons the material in these pages should be reviewed with the object in view of fixing these facts, and in particular, the importance of personal hygiene as emphasized in the sections on pneumonia and tuberculosis.

79501°—39

514.09
Un3m
no. 31

U. S. TREASURY DEPARTMENT
HENRY MORGENTHAU, JR., *Secretary*
PUBLIC HEALTH SERVICE
THOMAS PARRAN, *Surgeon General*

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE, IMPORTATION, AND SALE OF ARSPHENAMINE AND ITS DERIVATIVES, REFERRED TO COLLECTIVELY AS "THE ARSPHENAMINES"

Approved June 27, 1938

Miscellaneous Publication No. 31

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1938

For sale by the Superintendent of Documents, Washington, D. C. - - - - - - - - Price 5 cents

TREASURY DEPARTMENT,
Washington, D. C., June 16, 1938.

These regulations supplement the Regulations for the sale of viruses, serums, toxins, and analogous products approved February 25, 1935, and supersede the Regulations for the control of the manufacture, importation, and sale of arsphenamine and its derivatives approved September 20, 1923.

C. R. REYNOLDS,
Surgeon General, U. S. Army.
P. S. ROSSITER,
Surgeon General, U. S. Navy.
THOMAS PARRAN,
Surgeon General, U. S. Public Health Service.

Approved June 27, 1938:
STEPHEN B. GIBBONS,
Acting Secretary of the Treasury.

614.D9
U.S.3 no
no. 31

REGULATIONS FOR THE CONTROL OF THE MANUFACTURE, IMPORTATION, AND SALE OF ARSPHENAMINE AND ITS DERIVATIVES, REFERRED TO COLLECTIVELY AS "THE ARSPHENAMINES"

Pursuant to the authority contained in section 4 of the act of July 1, 1902, 32 Stat. 729 (U. S. C. title 42, sec. 145), the following regulations for the control of the manufacture, importation, and sale of arsphenamine and its derivatives, referred to collectively as "the arsphenamines," are hereby promulgated:

1. The arsphenamines (which term, as used in these regulations, means arsphenamine and its derivatives) shall not be sold, bartered, or exchanged, or offered for sale, barter, or exchange in the District of Columbia, or sent, carried, or brought for sale, barter, or exchange from any State, Territory, or the District of Columbia, into any State, Territory, or the District of Columbia, or from any foreign country into the United States, or from the United States into any foreign country, except after compliance with these regulations.

2. The arsphenamines shall be manufactured only in laboratories which have been duly licensed by the Secretary of the Treasury upon recommendation of the Surgeon General of the Public Health Service, but no recommendation for license will be made until clinical evidence of the safety and therapeutic efficacy of the preparation has been submitted by the manufacturer.

3. Laboratories licensed for the manufacture of any of the arsphenamines shall be subject to inspection, at any time, by officers of the Public Health Service when detailed by the Surgeon General.

4. The manufacturer shall keep records (*a*) of the production, (*b*) of the tests made to determine the purity and safety, and (*c*) of the distribution of each lot of any of the arsphenamines which is to be sold under these regulations.

5. The tests to be made for determining the purity and safety of each lot of any of the arsphenamines shall include those for (*a*) stability, (*b*) solubility, (*c*) arsenic content, (*d*) moisture content, and (*e*) relative nontoxicity.

(*a*) Stability shall be determined by exposing the ampuled product to a temperature and for a period to be determined by the Surgeon General of the Public Health Service, during which time it should show no marked change in color, consistency, or solubility.

83362—38

(*b*) Any product, both before and after being subjected to the above test, shall be *completely* soluble in distilled water within 15 minutes, in a concentration as great as is recommended for its intravenous administration.

(*c*) The arsenic content shall be determined by Lehmann's method as described in Public Health Reports, volume 33, June 21, 1918, page 1012; the minimal amount allowed for arsphenamine is 30 percent and for any of its derivatives, 19 percent, unless otherwise specifically provided by the Surgeon General of the Public Health Service. Variations above these figures are permissible provided the theoretical arsenic content of the preparation is not exceeded.

(*d*) The moisture content shall be determined by exposing approximately 1 gram of powder in a weighing bottle of not less than 20 mm diameter in vacuum of at least 5 mm over fresh phosphorus pentoxide for not more than 24 hours at room temperature.

(*e*) The relative nontoxicity shall be determined by administration of the arsphenamines, in the concentrations and doses given below, into the saphenous vein of healthy albino rats weighing from 100 to 150 grams (pregnant females excluded) at the rate of 0.1 cc in 12 to 15 seconds. For each toxicity test at least five rats shall be used, and at least 60 percent must survive the periods of observation stated below, but, in any case, the final result must be based on the total number of rats injected. The rats should be fed a well-balanced ration but should have no access to food for from 12 to 18 hours preceding injection. An adequate supply of fresh, clean water should be provided at all times.

Doses, concentrations, and periods of observation

Product	Tolerated dose in mg per kg	Concentration of solution	Period of observation
		Percent	*Days*
Arsphenamine [1]	120	2	2
Neoarsphenamine	240	4	6
Sodium arsphenamine	180	4	2
Silver arsphenamine [2]	140	2	2
Neosilverarsphenamine [3]	240	4	4
Sulfarsphenamine	300	4	3

[1] Arsphenamine must be converted into its disodium salt solution before making up to final volume, by adding 0.85 cc normal sodium hydrate per 0.1 gram of the drug used. To insure stabilization of the solution it should stand at room temperature for from 15 to 30 minutes before the injections are begun.

[2] Silver arsphenamine should have a silver content of 13 percent, but a variation of 1 percent in either direction is permissible.

[3] Neosilverarsphenamine should have a silver content of between 6 and 7 percent.

6. The manufacturer shall forward to the National Institute of Health not less than 15 ampules, maximum size human dose, from each lot, together with the protocols of the tests set forth above; these protocols should be furnished on forms approved by the Surgeon General, Public Health Service, or his representative.

7. At the time of official release manufacturers shall retain not less than 15 ampules, maximum size human dose, of the product from each lot.

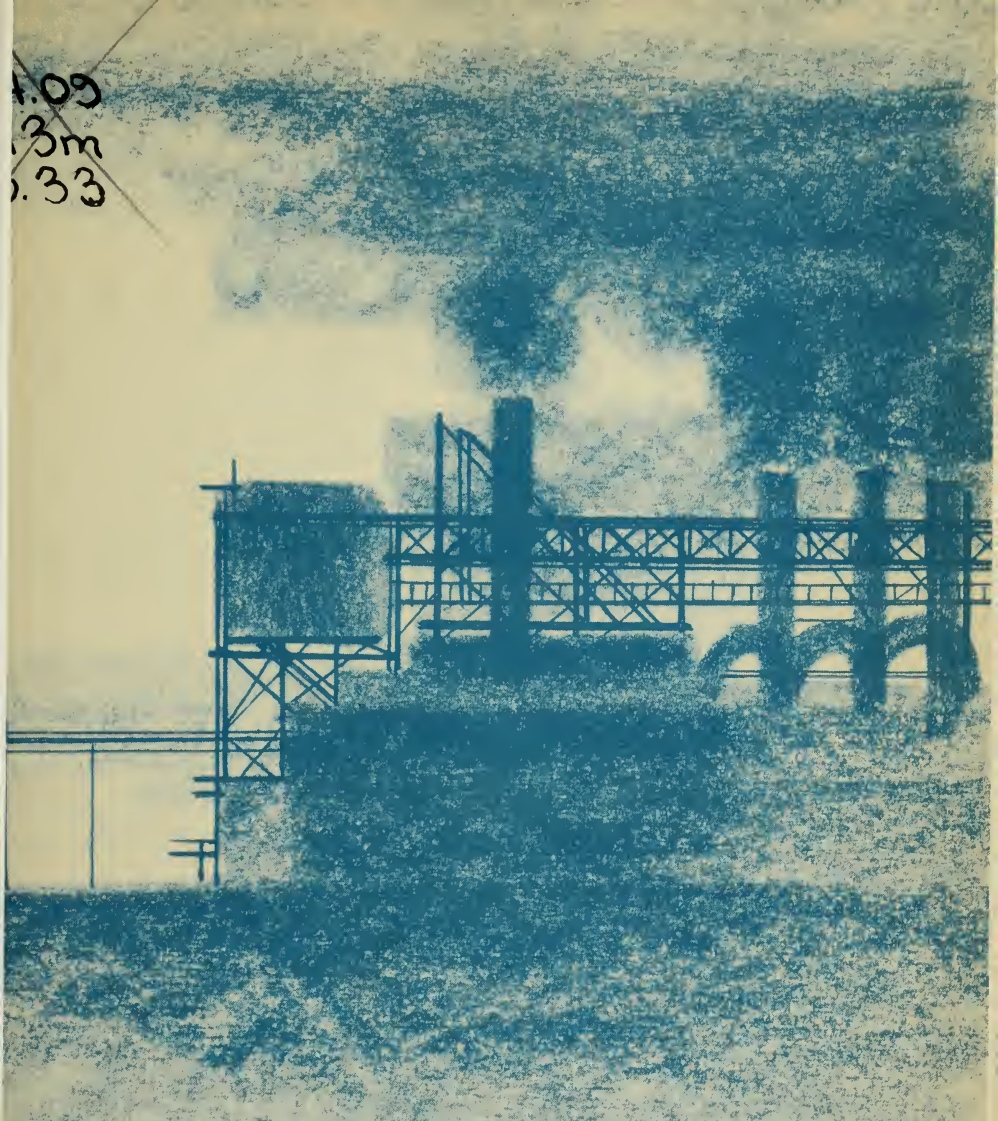
8. Each *ampule* shall be plainly labeled showing the amount (in grams) of drug contained, the lot number, the official name of the preparation, and the name of the manufacturer. The label should be small, leaving as much as possible of the glass exposed to afford ready inspection of the drug. The container of one or more ampules shall show the name of the manufacturer, his address, the license number, the official name of the drug, the amount contained in each ampule, the lot number, and the expiration date. Route for administration of products not intended for intravenous injection shall be plainly stated on the labels for both the carton and the ampule.

9. Dating decisions shall be issued by the Surgeon General of the Public Health Service from time to time as may be required.

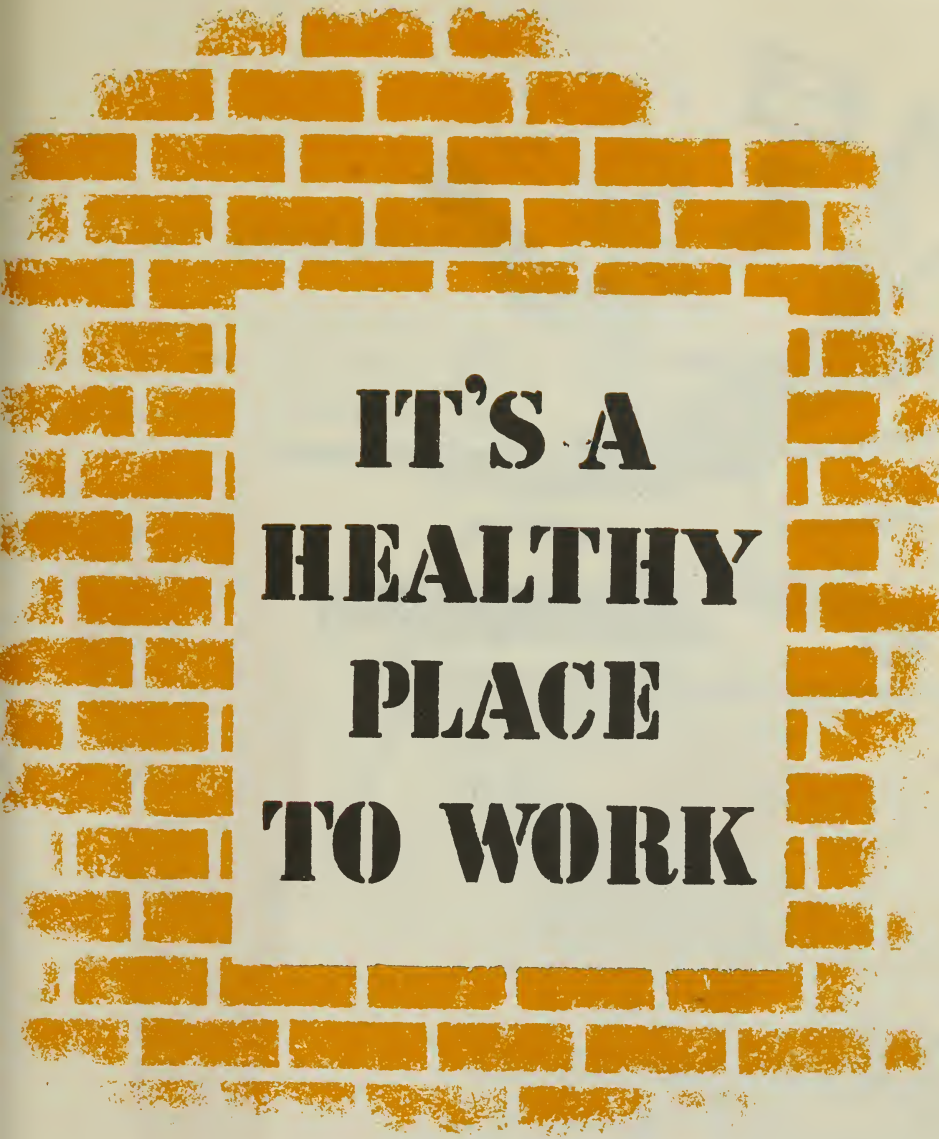
10. When lots have satisfactorily passed the prescribed tests they may be offered for sale upon being released by the National Institute of Health, but the right is reserved to require withdrawal from the market of any lot designated by the Surgeon General of the United States Public Health Service.

○

4.09
.3m
.33



AT YOUR SERVICE



NDUSTRIAL HEALTH PAYS!

U. OF ILL. LIB.

means lower costs for workmen's compensation . . . cuts training costs

IT PAYS MANAGEMENT BECAUSE:

it increases production by cutting down man-hours lost from work . . . keeps skilled workers on the job . . . keeps employees satisfied and therefore efficient. . .

617.09
Un3m
no.33-39

IT PAYS LABOR BECAUSE:

it prevents the misery of sickness and injury . . . protects the worker,

his family

and his community, by lengthening the span of his productive years . . . develops understanding of personal health needs . . . keeps employees earning longer.

Industrial Hygiene is the weapon with which modern science attacks this problem.

Health hazards in industry can be overcome . . . science knows how!

Management can provide safeguards against them . . . workmen can protect themselves . . . if they know how.

Does only the old-style, health-neglectful plant have industrial health hazards? Not at all. Even the modern, progressive plant with a good medical department may have hidden dangers to the health of its workers.

Science has licked many of the old menaces. It's a poor mine nowadays that lets its workers get silicosis. It's a poor plant that lets its workmen get lead poisoning.

But chemistry is adding new substances all the time to the materials used by industry. Some are dangerous. Which ones? They can't be recognized by sight or name.

Methods change. Change a harmless process, and it may kill workers.

LET THE EXPERTS HELP!

There is an agency responsible to the people for guarding the health of workers . . . staffed with experts, trained to recognize industrial health hazards, able to solve in-plant health problems, equipped to wipe them out.

It is the DIVISION OF INDUSTRIAL HYGIENE of your State or City. Let it serve you.

Industrial physicians . . . industrial hygiene engineers . . . industrial nurses . . . chemists . . . dentists . . .

In everything connected with industrial health they are ready to give you their help.

Behind them are laboratories . . . to help the doctors diagnose cases of occupational disease, to test samples of air containing invisible menaces, to analyze dangerous materials used by industry.

And behind them stands the Industrial Hygiene Division of the United States Public Health Service.

Your Department of Health
Industrial Hygiene Division

the doctor

industrial engineer

chemist

U. S. Public Health Service
Industrial Hygiene Division

Is the right specialist lacking to solve your particular problem of industrial health? The national industrial hygiene unit will lend such a specialist to you, through your own local division of industrial hygiene. He will bring to your problem experience gained in dealing with situations like yours throughout the Nation.

Is the problem in your plant so complicated that the local laboratories can't handle it? It can be solved in the big industrial hygiene research laboratories of the United States Public Health Service. They're working all year 'round . . . adding to the scientific knowledge about industrial sickness . . . learning the danger or safety of new industrial methods and materials . . . developing new and better ways to deal with the old dangers.

HOW THE EXPERTS HELP

Ask for the help of your industrial hygiene division to clear up a dangerous or suspected condition in your plant, and you will get—

a team of experts

Each member will look at your problem from the angle of his own knowledge . . . work on it with his own special skill. Cooperative attack is what it takes to solve problems of industrial health.

The Medical Problems

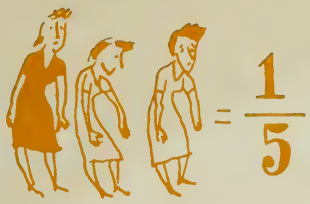
It takes an industrial physician to tackle industrial sickness in a plant. Skin troubles caused by cutting oils, acids, solvents, cleansers. Troubles caused by breathing dangerous dusts . . . asbestos, silica, bits of metal, coal dust, animal hair . . . to mention just a few. Troubles caused by breathing dangerous fumes, vapors, gases . . . and the list of chemicals that give off such substances is long. Eye troubles, digestive disorders, "colds" . . . all the many ailments which may knock a key worker off the job. Doctors must know the processes and materials of industry before they can diagnose with certainty the ills that result from them.

Your own plant physician can receive valuable help from the doctor-member of the industrial hygiene team.

But if you have no plant physician your plant especially needs this service. How many of your employees are out today? Do you know the causes?

Take this case, just as an example:

A mysterious wave of illness swept through a plant . . .



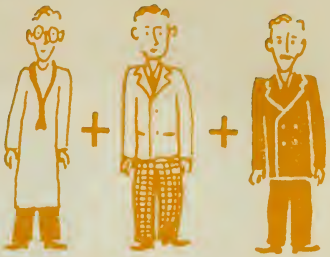
manufacturing parachutes. A fifth of the working force of 675 women were sick.

"Something-I-ate" was blamed for the trouble by most of them.

But the plant nurse wasn't sure. And new cases kept developing.

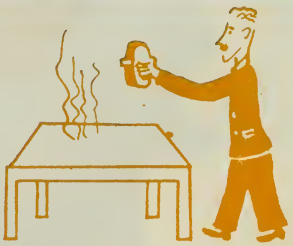
The nurse knew she needed help. She called upon the County Health Department. Public health doctors were sent. They examined all the sick women . . . studied each case . . . checked and found there was no epidemic in the community, none of the same kind of illness in families of the sick workers.

Each case was studied carefully.



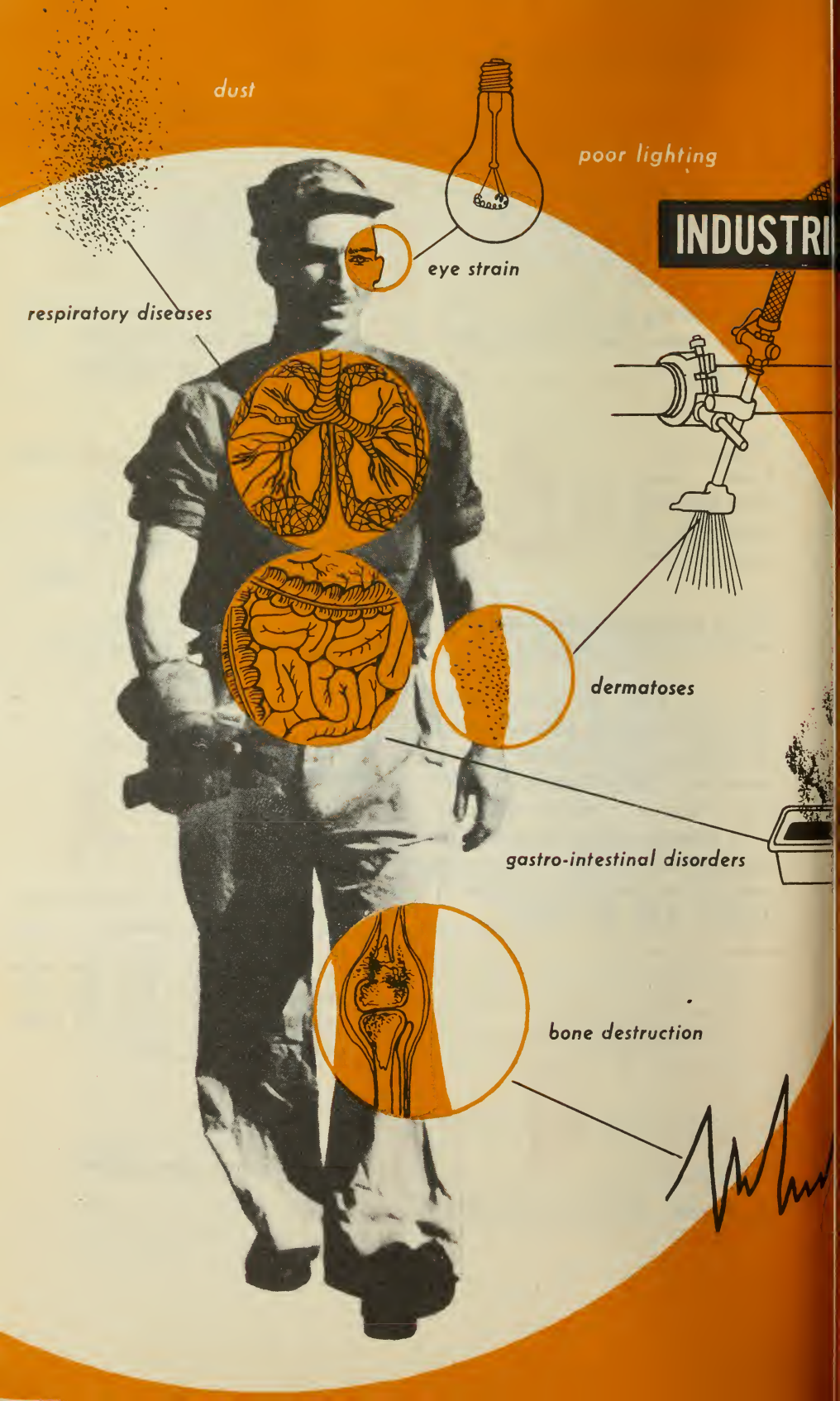
The teamwork of the industrial hygiene unit went into action. The State engineers were called in.

Many investigations were made.



Samples of air in the workshop showed a highly poisonous vapor . . . more than twice the safe amount, generated from the spotting solution for cleaning the nylon parachutes . . . toxic!

The mystery was solved.


dust
poor lighting
INDUSTRI
eye strain
respiratory diseases
dermatoses
gastro-intestinal disorders
bone destruction

EALTH HAZARDS CAN BE CONTROLLED

tting oils

vapors

engineer doctor chemist

WITH THE HELP OF THE TEAM OF EXPERTS

dioactive substances

THE ENGINEERING PROBLEMS

What can the industrial hygiene engineer do for the health of your workers?

Engineers on the industrial hygiene team are concerned with everything in your plant that might harm workers. They will investigate ventilation, unnecessary noise, poor lighting . . . find out whether air is being made poisonous by dangerous dust, fumes, vapors, gases . . . look into conditions which may be causing skin disease or other ailments among employees . . . investigate every step in the process of manufacture for health hazards.

You can count on the engineer members of the industrial hygiene team to be interested in two things only . . .

discovering whatever health hazards exist in your plant . . . devising ways to control or correct them.

More. The industrial hygiene engineer can be depended upon to clear up unhealthy conditions in the most economical way. Finding a problem of dust control, he may recommend installation of a patented system . . . but, if it will work just as well, he is likely to suggest a simple system that can be built cheaply in the plant.

And he can coordinate all community facilities to help clear up a dangerous situation in your plant.

ANALYZING INDUSTRIAL DANGERS

The physician, the engineer, working to clear up a dangerous industrial condition, have behind them the industrial hygiene laboratory. Here skilled chemists make the analyses upon which doctor and engineer depend.

Examinations of personnel by the industrial hygiene team doctor have to be backed up by laboratory analysis of blood, of urine, other body secretions. The industrial physician employed by a plant, too, often makes use of this service.

In one eastern plant, recently, the doctor suspected that some of the men were being poisoned by mercury. He sent urine specimens to the state industrial hygiene laboratory. His diagnosis was confirmed by the chemists, and he could go ahead confidently to give the right treatment.

And the engineer's observations at the plant must be backed up by a whole series of tests in the laboratory . . . tests of air samples, to see whether they show an overload of poisonous substances . . . tests of raw materials, of solvents, paints, and so on, to see whether anything used in the process of manufacture is making men sick.

Improving your nursing service

The industrial hygiene division of your health department is ready to help you establish a nursing service, or improve the one you have. Ask for assistance . . . and the nursing consultant will come and make a study of your plant, with the purpose of solving its specific problems.

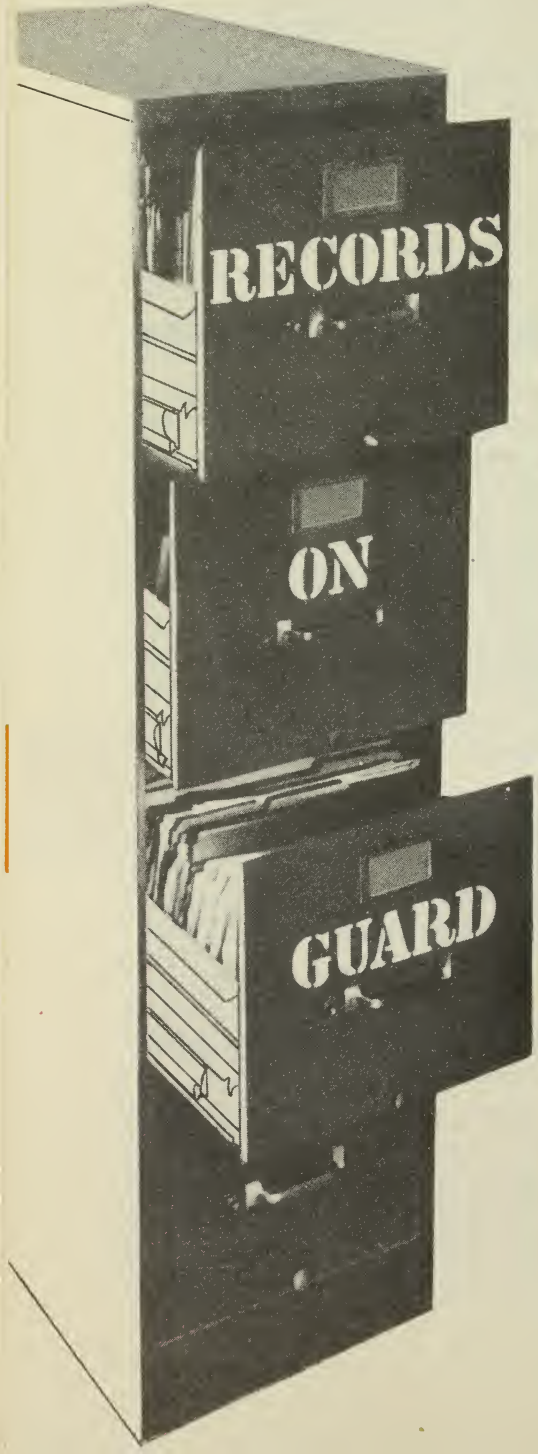
The plant too small to warrant a doctor in full-time service can furnish adequate medical care for its employees with a doctor part-time or on call and a well-planned nursing service.

But industrial nursing is a special field, needing special knowledge and skills. Management can expect the full benefits of a nursing program only if it is staffed with nurses who understand the materials, processes, and illnesses of industry. The nursing consultant will help you find such qualified industrial nurses.

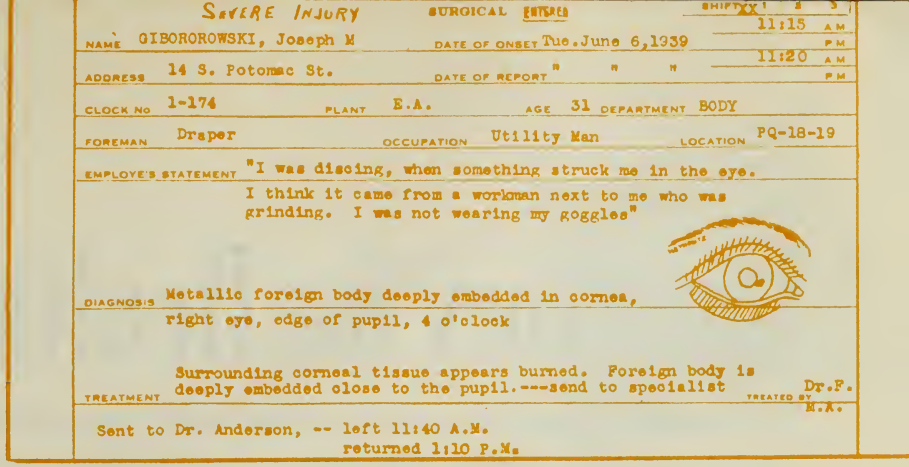
If your plant already employs nurses, the nursing consultant can still be very useful to you. For through this consultant your own nurses can keep in constant touch with the practices and methods of the most successful nursing services in your industry. They have only to ask for this help.

But your budget for health protection doesn't permit a nursing service? Let the nursing consultant study your problem. If a part-time industrial nurse is the answer to your needs, the consultant will make arrangements for you with the proper community nursing agency.

How big should a plant be, to need nursing service? The need is measured really not so much by the plant's size as by the dangers its workers face. But practice has shown that a plant with a hundred employees may profit by having a full-time nurse. Where from 300 to 600 persons are employed, it's best to have two or more nurses. And at least three nurses are necessary for the plant with a thousand workers.



KNOWLEDGE THROUGH RECORDS:



SEVERE INJURY — SURGICAL — ENTERED — SHIFT XX — 11:15 AM

NAME GIBOROWSKI, Joseph M — DATE OF ONSET Tue. June 6, 1939 — 11:20 AM

ADDRESS 14 S. Potomac St. — DATE OF REPORT " " " — PM

CLOCK NO 1-174 — PLANT E.A. — AGE 31 — DEPARTMENT BODY

FOREMAN Draper — OCCUPATION Utility Man — LOCATION PQ-18-19

EMPLOYE'S STATEMENT "I was dicing, when something struck me in the eye. I think it came from a workman next to me who was grinding. I was not wearing my goggles"

DIAGNOSIS Metallic foreign body deeply embedded in cornea, right eye, edge of pupil, 4 o'clock

TREATMENT Surrounding corneal tissue appears burned. Foreign body is deeply embedded close to the pupil.---send to specialist — TREATED BY Dr.F. M.A.

Sent to Dr. Anderson, -- left 11:40 A.M. returned 1:10 P.M.

Your plant employs watchmen to guard against theft or damage to property. Modern, progressive plants are employing another kind of watchman . . . a watchman to catch—

the thief of time . . . the thief that steals man-days from production . . . costly, wasteful, avoidable sickness. Medical records and reports are to your plant what bookkeeping is to your business office. Like cost accounting, they're a wall against waste . . . waste of time and money.

How can you employ this watchman to guard your plant?

You can call upon your industrial hygiene bureau to plan for you and help your medical department set up a sound, modern system for keeping track of health and safety.

A good system of industrial medical records covers every employee in the plant from the day he's hired to the day he leaves. It shows the record of all his injuries and illnesses, and their duration. It makes possible proper job placement in relation to physical condition.

When this injury-by-injury, sickness-by-sickness record is summarized for the whole plant, spot-mapped to show which departments have the most sickness and injury . . . you have another thing of great value. For your safety director, your engineer, and your medical department have the guidance they need to do their work efficiently. Corrective measures can be taken when they're least expensive and most effective . . . before serious trouble strikes.

It sounds complicated and expensive? But it isn't. The medical director in a major division of one great corporation has found that it takes little more than a minute per case to keep an extremely effective record system going.[1]

Already sickness and injury records are being kept on a large proportion of American workers. Your plant, too, should be among those which protect themselves and their employees with this modern weapon of knowledge.

[1] "Records—The 'Seeing Eye' of Industrial Medicine," by William J. Fulton, M. D., Industrial Medicine, Vol. 13, No. 1, January 1944.

Inventory for Health

What business enterprise could do without regular inventory?

The plant that takes inventory of its health and safety situation regularly is just as sensible as the man who protects his personal health by getting a complete physical check-up once a year. It's protection where it counts . . . nipping serious trouble in the bud instead of waiting until it has developed into something expensive and hard to cure.

Your industrial hygiene bureau stands ready to give you this kind of preventive service. It should be done regularly, on schedule.

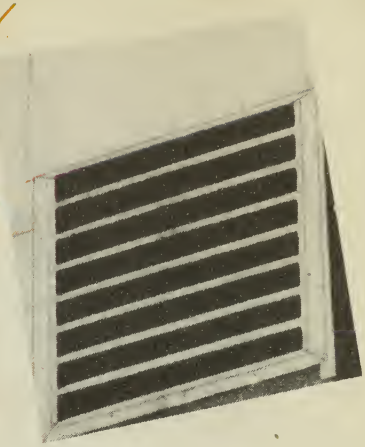
Maintaining healthful working conditions in the plant is as important as setting them up in the first place.

You spend a substantial sum to have ventilation equipment installed for drawing off toxic fumes or dust. But unless there's a regular re-survey to make sure the equipment is doing its job, the sense of security resulting from this expenditure is likely to be false—and expensive.

A manufacturer spent a sizeable amount for down-draft ventilation under worktables where hundreds of girls were assembling certain war materials. It was a good system, installed on the recommendation of industrial hygiene engineers. But after a time the girls began to complain of headache and dizziness. One after another stayed home a day or two each week, or quit her job. The manufacturer asked for a re-survey of his plant.

It wasn't hard for the engineers to locate the trouble. These girls were using rubber cement . . . and as each brushful was lifted from pot to part, it dripped a little on the ventilator grid. The grids had become so covered that the girls were breathing poisonous vapors. The cure was simple—a guard placed on each table so that ventilators were kept clear.

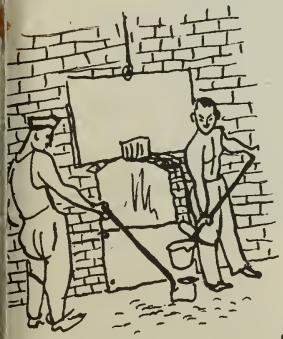
Sometimes management fears that workers may become alarmed over health conditions in the plant when they see another industrial hygiene survey being made. But experience has shown the exact opposite to be the case. Employees are reassured when they know there's scientific control of health conditions in their plant. They know the company is doing everything in its power to protect them.



ventilation

lighting

heat and humidity control



fumes

PARTNERS IN HEALTH PROTECTION

Should industry concern itself with the general state of health of its workers . . . with those causes of illness that aren't directly the result of work processes and working conditions?

Important as it is to clear up industrial sickness as the cause of absence from work, its seriousness is far overshadowed by sickness of non-occupational origin. For this, too, industry and workers must pay . . . pay through lowered production, through loss of wages, through family disaster. And pay as well through taxes . . . the cost of finding and treating those diseases at present accepted as a public responsibility.

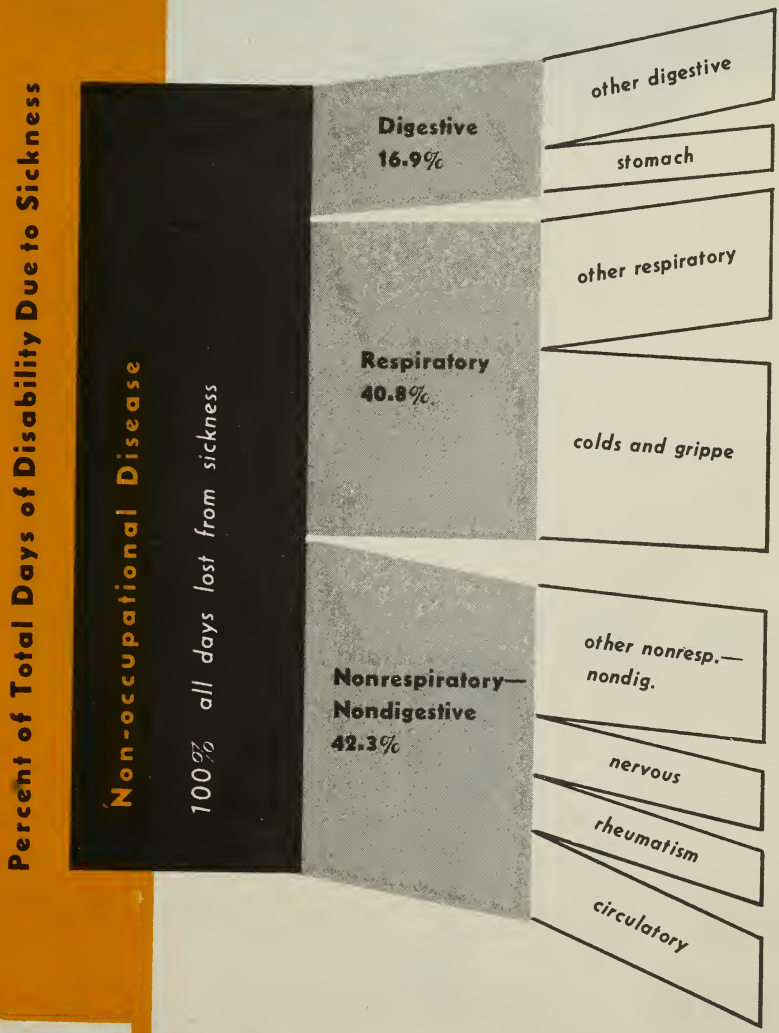
Working together in partnership, management, unions, health departments of city, county, state, and nation, and the family doctor, can raise the health level of all employees . . . can wipe out at least some of the diseases that kill or cripple.

Their place of work is the best place to reach your employees with health protection of many kinds. X-ray to find tuberculosis in its early stages . . . tests to locate venereal disease . . . immunization against smallpox and typhoid . . . a program to find dangerous dental conditions and clear them up . . . early spotting of mental disease, to prevent personal tragedy and perhaps a lifelong burden on the public . . . these are only some of the helps that can be brought to your plant, with benefit to management and workers.

The nutrition of your workers can be improved. Health education through a plant program can teach them to follow modern ways toward better health.

Let your **industrial hygiene bureau** be your full partner in this big job. It is ready to act as liaison between your plant and every agency of community, state, and nation which works in health protection. It is ready to serve as counsel to management and labor unions in all problems of health.

Such a partnership has won the endorsement of many leaders in the industrial, labor, and medical life of the United States. Its possibilities for useful work are limited only by the vision of what can be done.



Note: Similar data for occupational diseases not available.

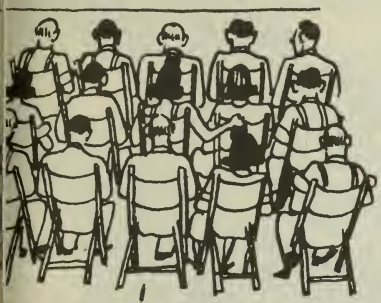
INDUSTRY

to safeguard

FAMILY DOCTOR

HOSPITAL

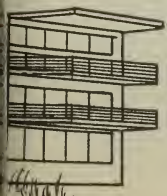
LABOR



+

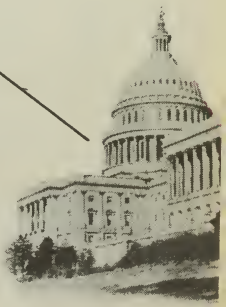
PUBLIC HEALTH PROGRAM

the health of the worker



+

STATE, LOCAL & FEDERAL GOVERNMENT



health service to aid you!

There's a new viewpoint developing rapidly in American industry . . . the understanding that industrial enterprise benefits by everything that benefits workers—and health is first in importance. Labor unions more and more are feeling that they, too, must carry responsibility for health.

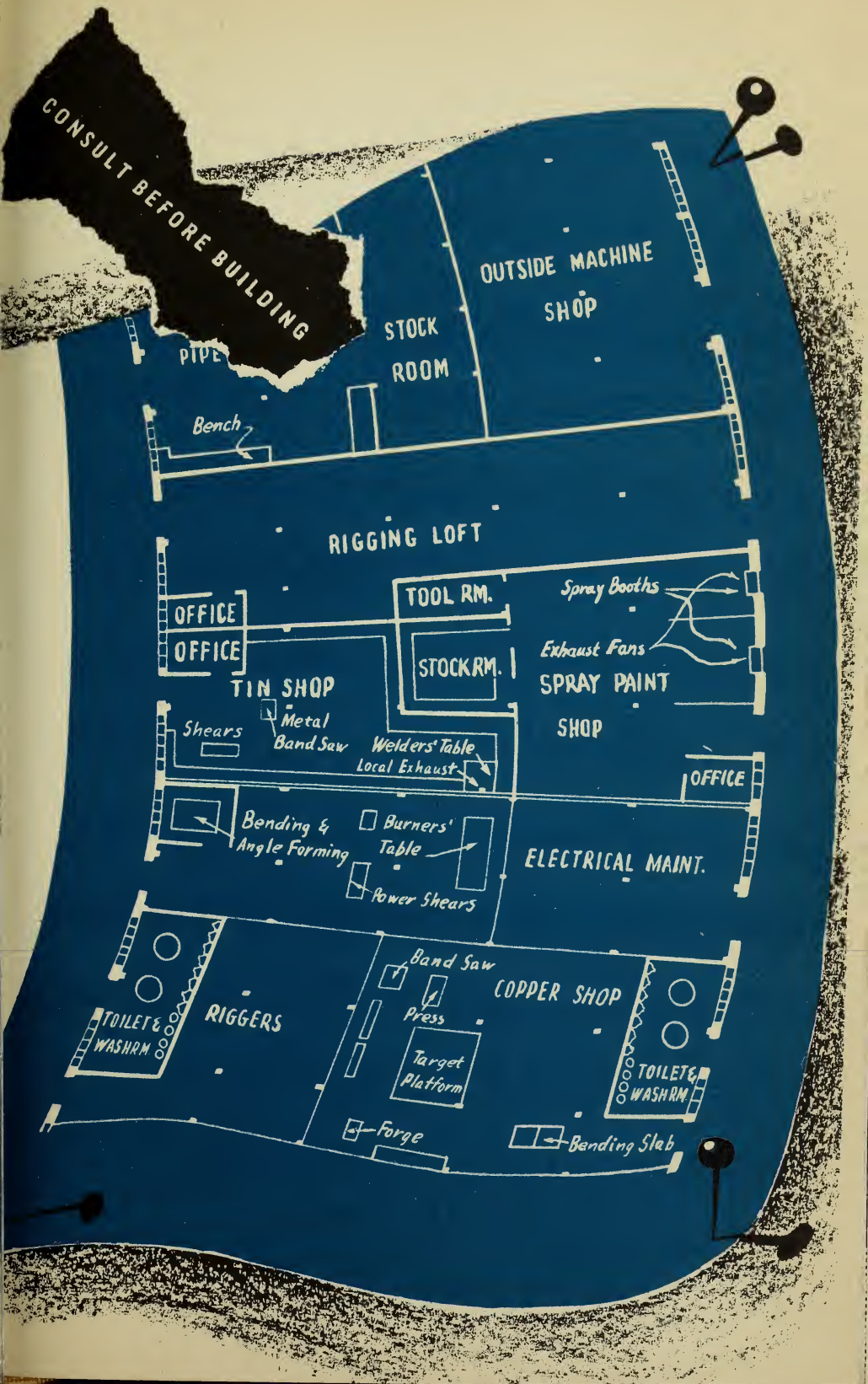
Many of the great industries of the United States are completely convinced, on a dollars-and-cents basis. They're going ahead with large and carefully planned programs for health and safety. And smaller plants are starting health programs as their value becomes clear.

Make use of your industrial health agency. Consult with it before setting up a medical department, or making administrative changes that affect the health of employees.

And before building a new plant or making important alterations, ask these experts to plan with you, so that sound and modern methods of health protection can be built into the structure . . . not added expensively after harm already has been done.

Call in your State or local **Division of Industrial Hygiene** . . . so that your employees, too, can say with confidence and pride . . .

"It's a healthy place to work!"


CONSULT BEFORE BUILDING
OUTSIDE MACHINE SHOP
STOCK ROOM
PIPE
Bench
RIGGING LOFT
OFFICE
OFFICE
TOOL RM.
STOCKRM.
TIN SHOP
Shears
Metal Band Saw
Welders' Table
Local Exhaust
Spray Booths
Exhaust Fans
SPRAY PAINT SHOP
OFFICE
Bending & Angle Forming
Burners' Table
Power Shears
ELECTRICAL MAINT.
TOILET & WASHRM.
RIGGERS
Band Saw
Press
COPPER SHOP
Target Platform
TOILET & WASHRM.
Forge
Bending Slab

Miscellaneous Publication No. 33
For sale by the Superintendent of Documents, Price 10c
Federal Security Agency
U. S. PUBLIC HEALTH SERVICE

U. S. GOVERNMENT PRINTING OFFICE : 1945—O—649777

4.09
.3M3
.34

Brucellosis

(Undulant Fever)

By

ALICE C. EVANS

MISCELLANEOUS PUBLICATION No. 34

OF ILL. LIB

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF PUBLIC HEALTH METHODS

G. ST. J. PERROTT, *Chief of Division*

✦

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1945

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. • Price 5 cents

614.09
Un3m
no. 34

BRUCELLOSIS (UNDULANT FEVER)[1]

By Alice C. Evans, *Senior Bacteriologist, United States Public Health Service*

28 Jan 46 Barnes

Brucellosis, formerly known as undulant fever, or Malta fever, affects domestic animals as well as man. It is caused by infection with bacteria of the genus *Brucella*. In man, brucellosis may occur in an acute or in a chronic form. The human disease is not contagious in the ordinary sense, because it is rarely, if ever, transmitted from person to person. It is, however, readily spread from animal to animal, and from animal to man. In that sense it is communicable. In this country, cattle, goats, and hogs are the chief sources of infection. The disease occurs most frequently among people who have direct contact with infected animals or infected carcasses—farmers, veterinarians, and slaughterhouse workers. In them, brucellosis is an occupational disease. The meat of infected animals is safe to eat if it is thoroughly cooked.

People who have no direct contact with farm animals may, however, be exposed to infection by consuming dairy products, for infected animals yield infected milk. The consumption of raw infected dairy products is responsible for most of the cases that occur in the general population. The means of prevention are, therefore, obvious; for milk is safe if it is efficiently pasteurized. If commercially pasteurized milk is not available, pasteurization may be done at home. A good method is to place the milk over a flame and heat to 165° F., stirring constantly, or heat to 165° F. in a double boiler. Or, the milk may be brought to a boil. After heating, by whatever method, the milk should be cooled rapidly.

Because many large cities have ordinances which prohibit the sale of ordinary raw milk, brucellosis is predominantly a rural disease. City dwellers may, however, contract the disease during visits to the country.

Ice cream, butter, and cheese are likewise sources of danger if raw milk or cream is used in their manufacture. Soft cheese sold within a few days of manufacture is much more dangerous than hard cheese that is ripened for months, and several States now require either pasteurization or aging for cheese. The purchaser should obtain pasteurized products wherever available, and the consumer in a restaurant should request them.

The disease in cattle is called contagious abortion or Bang's disease. The question is sometimes asked whether raw milk from a "Bang-free" herd may be consumed safely. The answer is that no "Bang-

[1] From the National Institute of Health.

free" herd can be assumed to remain free of the disease. Undetected infection may be dormant in one or more cows, with the possibility of activation between the periods of examination.

The financial loss in the United States due to the death of prematurely born calves and to the decreased yield of milk in the infected animals has been estimated to be at least $50,000,000 annually. Since July 1934 the United States Department of Agriculture has conducted a campaign of eradication of contagious abortion in cattle. The disease was found to be prevalent throughout the country, though more common in some localilties than in others. When the work was begun, about 10 percent of cattle were found to be infected; now about 5 percent of cattle are estimated to be infected.

In most parts of the United States the chances of infection from goats or hogs are not so great as the chances of infection from cattle, because goats are not generally used as milch animals in this country, and because people generally have no direct contact with hogs.

The varieties of *Brucella* which attack goats and swine are more virulent for man than is the variety which commonly affects cattle, but cows sometimes contract brucellosis from goats or hogs, and through their milk transmit the more virulent germs to man.

For a number of years, between 3,000 and 4,000 cases have been reported annually to the health authorities in the United States, and conservative estimates indicate that only a small fraction of the actual number of cases is reported. The data on which the number of chronic cases might be estimated are especially meager, and we know that but few of the many chronic cases which occur are reported.

The time between exposure to brucellosis and the onset of symptoms varies widely—from 6 days to 3 months. The duration of the disease may be a few days or many years. The severity is extremely variable, ranging from a mild indisposition to severe illness. The manifestations are varied, making correct diagnosis difficult, even in acute cases. A mild attack may last only a few days, after which there is complete recovery. "Flu" is a common diagnosis in such cases, and the illness may be so mild that the patient does not consult a doctor.

If the disease is severe, it may be mistaken for tuberculosis, typhoid fever, malaria, or rheumatism, according to which one of those diseases it resembles most closely. If the acute illness is prolonged, other diseases will be ruled out, eventually, or the correct diagnosis may be arrived at with the aid of serologic tests, a skin test, or, best of all, by the cultivation of the organism from the blood or discharges of the patient. The average duration of the acute disease is 3 to 4 months. The fatality rate is generally between 2 and 3 percent.

Chronic brucellosis may follow an acute attack, or the onset may be insidious. Exhaustion, irritability, and complaints of aches and

pains, without objective signs, may be the only symptoms. In such cases, neurasthenia is a common diagnosis. If, however, chronic brucellosis is considered, the physician can make certain tests which may aid in arriving at a correct diagnosis in some cases. Positive results in the diagnostic tests are evidence of infection in a person whose symptoms suggest brucellosis, provided other diseases are ruled out. On the other hand, negative results from such tests may be of little significance, for in some chronic cases none of the known tests will reveal the identity of the disease. There are cases on record in which the specific tests resulted in completely negative findings, thus apparently ruling out brucellosis, and yet infection was proved by the cultivation of *Brucella* from the patient.

In brucellar infections there may be unrecognized foci somewhere in the body from which the organisms produce local or systemic symptoms. The poisons may affect the nervous system, making the patient irritable and despondent. He may be aware of no illness other than weakness, nervousness, muscular and joint pains, mild headache, exhaustion on slight effort, or insomnia. Fever may be present in a low degree, or it may be absent for weeks or months during which the patient may suffer from any or all of the above-mentioned symptoms. Ill health may continue for many years. Cases of 20 or more years' duration are known, usually with periods of apparent freedom from the disease.

In the bovine disease, abortion is the most characteristic symptom. In the human disease, abortion may occur when pregnancy is complicated by infection with *Brucella*. It does not always occur, however.

In cattle the young are somewhat immune to brucellosis. Children also are generally believed to be more resistant than adults, but they may develop the disease. The commonest manifestation in childhood is the so-called run-down condition wherein the patient becomes pale, languid, and irritable, loses weight, and tires easily. In children, therefore, the disease is often more difficult to diagnose than in adults. Hence, the incidence of the disease among children is unknown.

Science has not yet found a specific cure for brucellosis. The doctor can give symptomatic treatment to relieve pain, and supportive treatment to help Nature build resistance to the infection, but at present he can do little more than that. The patient can promote a return to health by taking adequate rest, an abundance of liquids, and plenty of wholesome food rich in all the vitamins. It is of especial importance to avoid fatigue. Patience in meeting the disappointments of repeated relapses is more than a virtue; it is an aid to recovery.

Climate apparently exerts no direct effect on the course of the disease.

U. S. GOVERNMENT PRINTING OFFICE: 1945

n3m
o.34
948

Brucellosis
(Undulant Fever)

By
ALICE C. EVANS

FEDERAL SECURITY AGENCY
UNITED STATES PUBLIC HEALTH SERVICE
THOMAS PARRAN, *Surgeon General*
DIVISION OF PUBLIC HEALTH METHODS
G. ST. J. PERROTT, *Chief of Division*

MISCELLANEOUS PUBLICATION NO. 34
(Revised January 1948)

BRUCELLOSIS (UNDULANT FEVER)[1]

By Alice C. Evans, *Senior Bacteriologist, United States Public Health Service*

Brucellosis, formerly known as undulant fever, or Malta fever, affects domestic animals as well as man. It is caused by infection with bacteria of the genus *Brucella.* In man, brucellosis may occur in an acute or in a chronic form. The human disease is not contagious in the ordinary sense, because it is rarely, if ever, transmitted from person to person. It is, however, readily spread from animal to animal, and from animal to man. In that sense it is communicable. In this country, cattle, goats, and hogs are the chief sources of infection. The disease occurs most frequently among people who have direct contact with infected animals or infected carcasses—farmers, veterinarians, and slaughterhouse workers. In them, brucellosis is an occupational disease. The meat of infected animals is safe to eat if it is thoroughly cooked.

People who have no direct contact with farm animals may, however, be exposed to infection by consuming dairy products, for infected animals yield infected milk. The consumption of raw infected dairy products is responsible for most of the cases that occur in the general population. The means of prevention are, therefore, obvious; for milk is safe if it is efficiently pasteurized. If commercially pasteurized milk is not available, pasteurization may be done at home. A good method is to place the milk over a flame and heat to 165° F., stirring constantly, or heat to 165° F. in a double boiler. Or, the milk may be brought to a boil. After heating, by whatever method, the milk should be cooled rapidly.

Because many large cities have ordinances which prohibit the sale of ordinary raw milk, brucellosis is predominantly a rural disease. City dwellers may, however, contract the disease during visits to the country.

Ice cream, butter, and cheese are likewise sources of danger if raw milk or cream is used in their manufacture. The purchaser should obtain pasteurized products wherever available, and the consumer in a restaurant should request them.

The disease in cattle is called contagious abortion or Bang's disease. The question is sometimes asked whether raw milk from a "Bang-free" herd may be consumed safely. The answer is that no "Bang-free" herd can be assumed to remain free of the disease. Undetected infection may be dormant in one or more cows, with the possibility of activation between the periods of examination.

[1] From the National Institute of Health.

The financial loss in the United States due to the death of prematurely born calves and to the decreased yield of milk in the infected animals has been estimated to be at least $50,000,000 annually. Since July 1934 the United States Department of Agriculture has conducted a campaign of eradication of contagious abortion in cattle. The disease was found to be prevalent throughout the country, though more common in some localities than in others. When the work was begun, about 10 percent of cattle were found to be infected; now about 5 percent of cattle are estimated to be infected.

In most parts of the United States the chances of infection from goats or hogs are not so great as the chances of infection from cattle, because goats are not generally used as milch animals in this country, and because people generally have no direct contact with hogs.

The varieties of *Brucella* which attack goats and swine are more virulent for man than is the variety which commonly affects cattle, but cows sometimes contract brucellosis from goats or hogs, and through their milk transmit the more virulent germs to man.

For a number of years, between 3,000 and 4,000 cases have been reported annually to the health authorities in the United States, and conservative estimates indicate that only a fraction of the actual number of cases is reported. The data on which the number of chronic cases might be estimated are especially meager, and we know that but few of the many chronic cases which occur are reported.

The time between exposure to brucellosis and the onset of symptoms varies widely—from 6 days to 3 months. The duration of the disease may be a few days or many years. The severity is extremely variable, ranging from a mild indisposition to severe illness. The manifestations are varied, making correct diagnosis difficult, even in acute cases. A mild attack may last only a few days, after which there is complete recovery. "Flu" is a common diagnosis in such cases, and the illness may be so mild that the patient does not consult a doctor.

If the disease is severe, it may be mistaken for tuberculosis, typhoid fever, malaria, or rheumatism, according to which one of those diseases it resembles most closely. If the acute illness is prolonged, other diseases will be ruled out, eventually, or the correct diagnosis may be arrived at with the aid of serologic tests, or, by the cultivation of the organism from the blood or discharges of the patient. The average duration of the acute disease is 3 to 4 months. The fatality rate is generally between 2 and 3 percent.

Chronic brucellosis may follow an acute attack, or the onset may be insidious. Exhaustion, irritability, and complaints of aches and pains, without objective signs, may be the only symptoms. In such cases, neurasthenia is a common diagnosis. If, however, chronic

U. OF ILL. LIB.

brucellosis is considered, the physician can make certain tests which may aid in arriving at a correct diagnosis in some cases. Positive results in the diagnostic tests are evidence of infection in a person whose symptoms suggest brucellosis, provided other diseases are ruled out. On the other hand, negative results from such tests may be of little significance, for in some chronic cases none of the known tests will reveal the identity of the disease. There are cases on record in which the specific tests resulted in completely negative findings, thus apparently ruling out brucellosis, and yet infection was proved by the cultivation of *Brucella* from the patient.

In brucellar infections there may be unrecognized foci somewhere in the body from which the organisms produce local or systemic symptoms. The patient may be irritable and despondent. He may be aware of no illness other than weakness, nervousness, muscular and joint pains, mild headache, exhaustion on slight effort, or insomnia. Fever may be present in a low degree, or it may be absent for weeks or months during which the patient may suffer from any or all of the above-mentioned symptoms. Ill health may continue for many years. Cases of 20 or more years' duration are known, usually with periods of apparent freedom from the disease.

In the bovine disease, abortion is the most characteristic symptom.

In cattle the young are somewhat immune to brucellosis. Children also are generally believed to be more resistant than adults, but they may develop the disease. The commonest manifestation in childhood is the so-called run-down condition wherein the patient becomes pale, languid, and irritable, loses weight, and tires easily. In children, therefore, the disease is often more difficult to diagnose than in adults. Hence, the incidence of the disease among children is unknown.

Science has not yet found a specific cure for brucellosis. The doctor can give symptomatic treatment to relieve pain, and supportive treatment to help Nature build resistance to the infection, but at present he can do little more than that. The patient can promote a return to health by taking adequate rest, an abundance of liquids, and plenty of wholesome food rich in all the vitamins. It is of especial importance to avoid fatigue. Patience in meeting the disappointments of repeated relapses is more than a virtue; it is an aid to recovery.

Climate apparently exerts no direct effect on the course of the disease.

U. S. GOVERNMENT PRINTING OFFICE: 1948

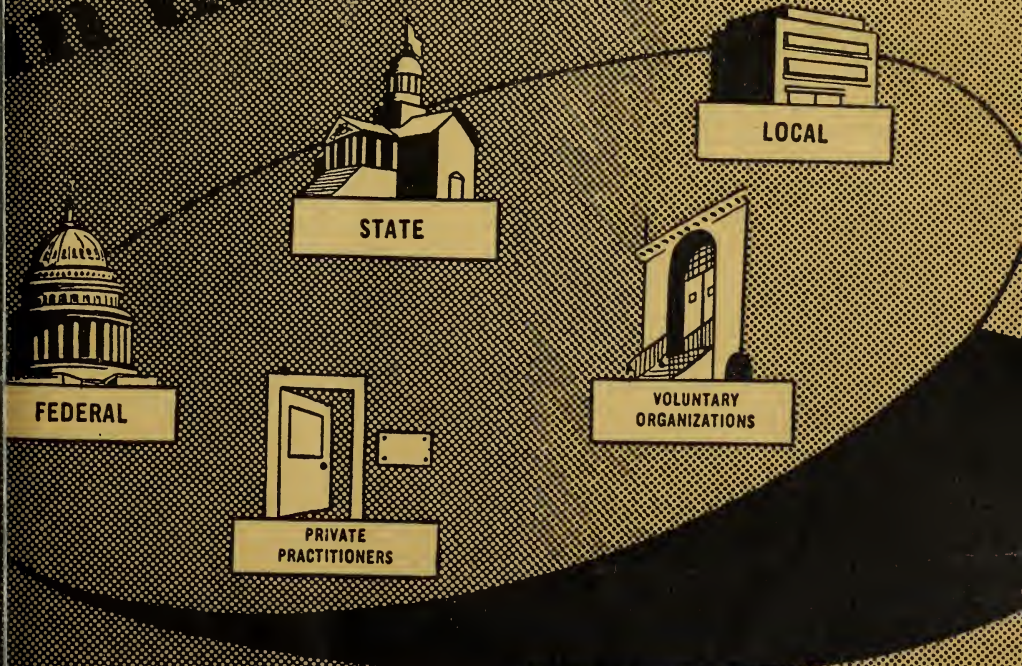
For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 5 cents

Un3m
no 35

GUIDE

TO HEALTH ORGANIZATION

in the United States



GUIDE
TO
HEALTH ORGANIZATION
IN
THE UNITED STATES

by

JOSEPH W. MOUNTIN, Medical Director

and

EVELYN FLOOK, Administrative Analyst

UNITED STATES PUBLIC HEALTH SERVICE

PREPARED BY DIRECTION OF THE SURGEON GENERAL

FEDERAL SECURITY AGENCY
U. S. PUBLIC HEALTH SERVICE

MISCELLANEOUS PUBLICATION No. 35

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. — Price 20 cents

614.07
Un 3m
no 35

FOREWORD

There has long been a need for a ready reference guide to health organization in the United States. The complex and divergent channels through which individuals receive health services in this country often confuse even experienced health workers.

This pamphlet brings together in simple, brief form the salient functions of the many agencies which render health services in the United States. The authors have pointed out the contributions of Federal, State, and local official and voluntary agencies and of private physicians, dentists, and nurses. The result is a panoramic view of the entire health structure of our nation.

The pamphlet should be of great help in orienting professional public health workers, visitors from other countries, and American students to the multiple systems of health service. It also is a concise and readable source of information for the general public.

The authors have not attempted an exhaustive presentation of the broad and technical subject of public health administration. To guide those who wish a more detailed and comprehensive grasp of the organization and administration of health services, an extensive bibliography has been appended.

Thomas Parran

Surgeon General.

TABLE OF CONTENTS

	Page
Foreword	i
Illustrations	v
Introduction	1
Federal Health Organization	3
State Health Organization	20
Local Health Organization	29
Voluntary Health Agencies	43
Professional Education	47
Summary	48
Bibliography	50
Appendix	56

THE COMPLETE PUBLIC HEALTH STRUCTURE

There are three distinct levels of health organization in the United States; Federal, State, and local. The complete health structure is illustrated here. Following illustrations show channels through which actual health services reach the individual citizens for whom they are designed.

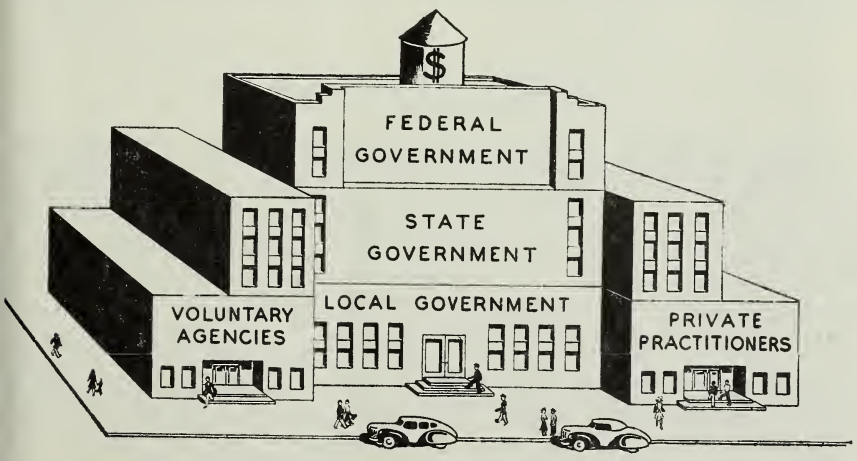


FIGURE 1—LEVELS OF HEALTH ORGANIZATION—The Complete Health Structure

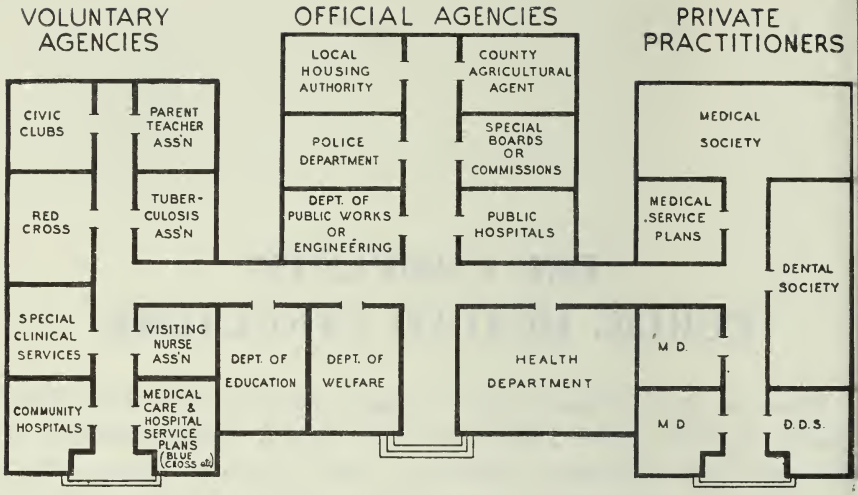


FIGURE 2—LEVELS OF HEALTH ORGANIZATION—The Ground Floor of the Health Structure—Local Official and Voluntary Agencies and Private Practitioners

LOCAL AGENCIES

Private physicians, dentists, and nurses constitute the foundation for individual health services. However, all residents of the community cannot afford the services of private practitioners. Certain elements of community health services originated with a number of public-spirited persons banding together (as voluntary agencies) to furnish the bulk of health service not obtained by the individual's direct efforts. Generally, however, protection of community health is a public responsibility discharged through official agencies of local government. Local health organization has been modeled closely after general local governmental organization. In some sections of the country, the city, town, and municipality constitute the local health jurisdiction. In others, county health departments and multicounty health units, known as local health districts, have flourished. About two-thirds of the total population of the United States is covered by organized local health service under the direction of a full-time health officer.

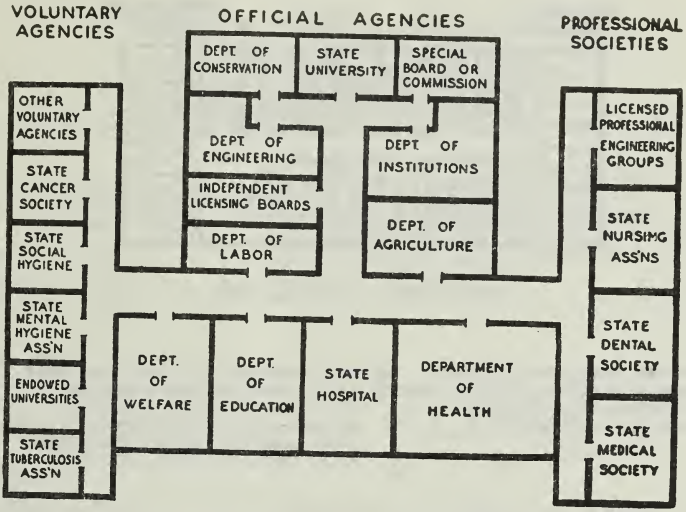
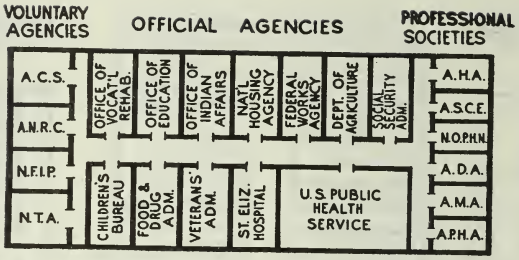


FIGURE 3—LEVELS OF HEALTH ORGANIZATION—The Second Floor of the Health Structure—State Official and Voluntary Agencies and Professional Societies

STATE AGENCIES

Health functions of State official agencies range from regulatory authority or advisory service only to the operation of complex direct service units. More adequate local health service is stimulated through promotional, advisory, and supervisory activities and through financial aid from State and Federal sources for approved health projects. Except for the provision of medical and institutional care, the State health department usually assumes leadership and guidance in the operation of health programs. Other agencies of State government shown here function as contributory bodies or assume responsibility for specific segments of the broader programs sponsored by the State health agency. Voluntary health agencies and professional societies operating on a State-wide basis also occupy a prominent position in the total health structure. Their functions, in relation to official State health agencies, are chiefly exploratory and supplementary.

693409—47—2



NATIONAL AGENCIES

LEGEND:
N.T.A. - NATIONAL TUBERCULOSIS ASSOCIATION
N.F.I.P. - NATIONAL FOUNDATION FOR INFANTILE PARALYSIS
A.N.R.C. - AMERICAN NATIONAL RED CROSS
A.C.S. - AMERICAN CANCER SOCIETY
A.P.H.A. - AMERICAN PUBLIC HEALTH ASSOCIATION
A.M.A. - AMERICAN MEDICAL ASSOCIATION
A.D.A. - AMERICAN DENTAL ASSOCIATION
N.O.P.H.N. - NATIONAL ORGANIZATION FOR PUBLIC HEALTH NURSING
A.S.C.E. - AMERICAN SOCIETY OF CIVIL ENGINEERS
A.H.A. - AMERICAN HOSPITAL ASSOCIATION

FIGURE 4—LEVELS OF HEALTH ORGANIZATION—The Third Floor of the Health Structure—National Official and Voluntary Agencies and Professional Societies

Federal official agencies are responsible for controlling interstate health hazards and protecting this country from the importation of communicable diseases from abroad. The Federal Government sponsors research and demonstration into the cause, prevention, and control of disease and allots grants-in-aid for the expansion of State and local health services. Designated beneficiaries of the Federal Government receive direct health service. The United States Public Health Service is the chief Federal health agency, but numerous other agencies have certain health interests and responsibilities directly related to their broader functions. The chief contributions of National voluntary agencies and professional societies are program planning, formulating standards, and preparing educational material in their respective fields.

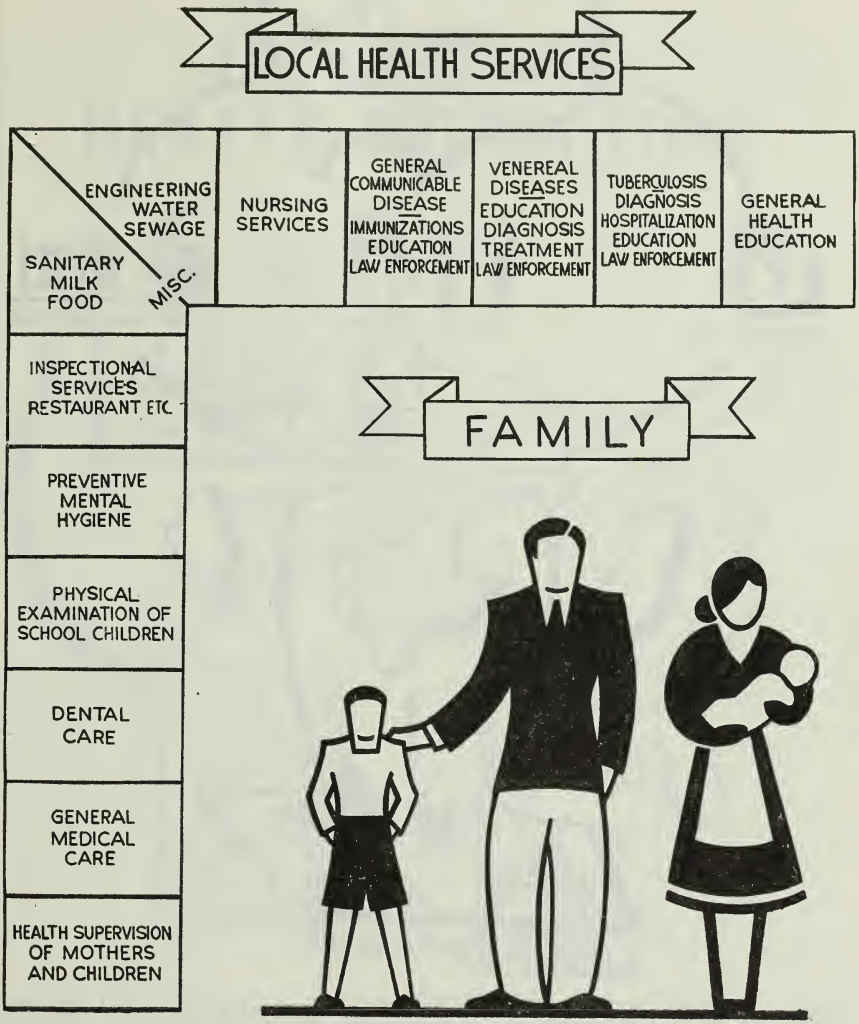


FIGURE 5—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—Local Agencies Operate Directly

The average citizen receives most of his personal health services from a local official or voluntary agency or from his private physician, dentist, and nurse.

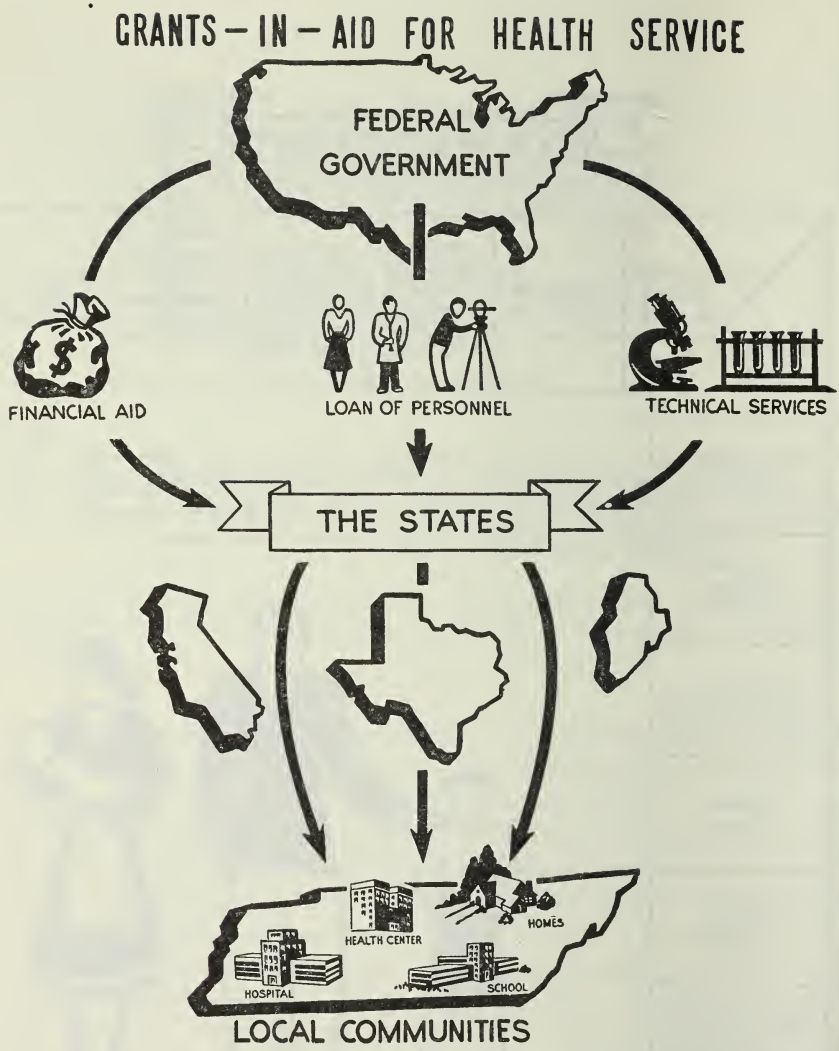


FIGURE 6—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—State and Federal Agencies, Either Directly or Indirectly, Assist the Local Agencies

State agencies assist local agencies in the provision of health services largely through financial aid, loan of personnel, performance of technical services, advice, and supervision. Part of this assistance originates at the State level, while the Federal Government is the source of another portion. Federal aid is extended to the States, then reallocated to the local jurisdictions.

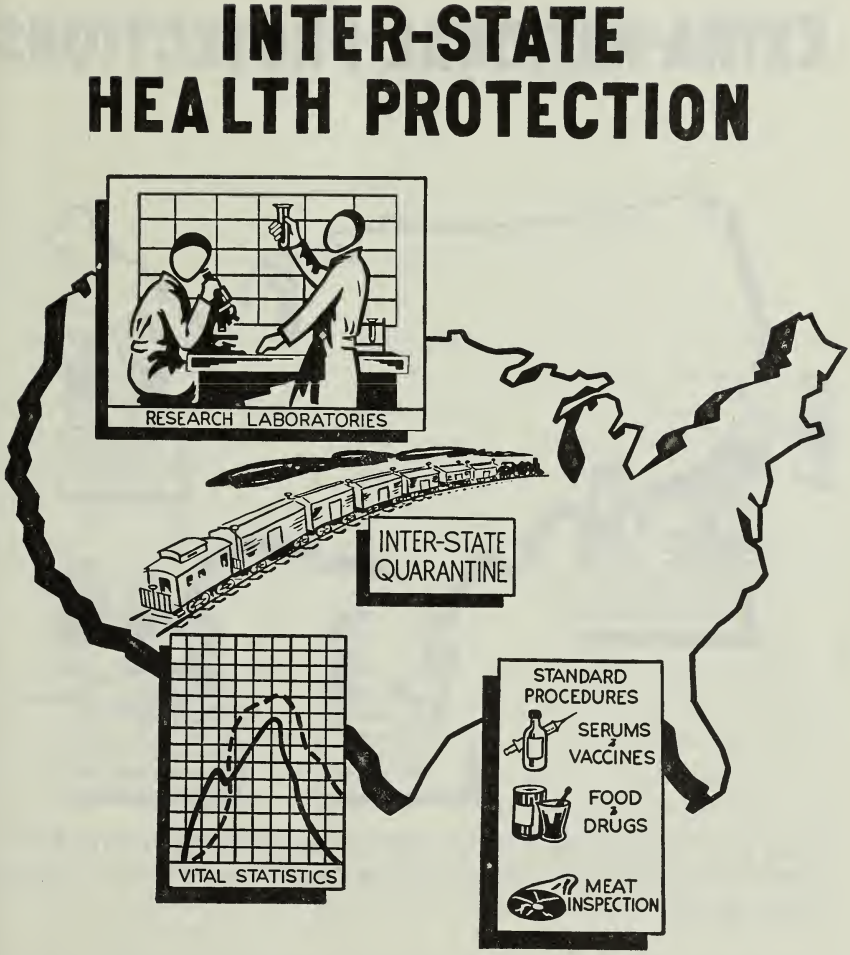


FIGURE 7—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—The Federal Government Functions Directly for Interstate Health Protection

Control of interstate quarantine and health matters involved in interstate traffic, stabilization of the quality of foods and drugs, control of biological products, and maintenance of research laboratories for study of cause and prevention of disease are health functions performed directly by Federal agencies. In some instances, State personnel are delegated to act as agents of the Federal Government in exercising certain interstate controls.

EXTRA-NATIONAL PROTECTIONS

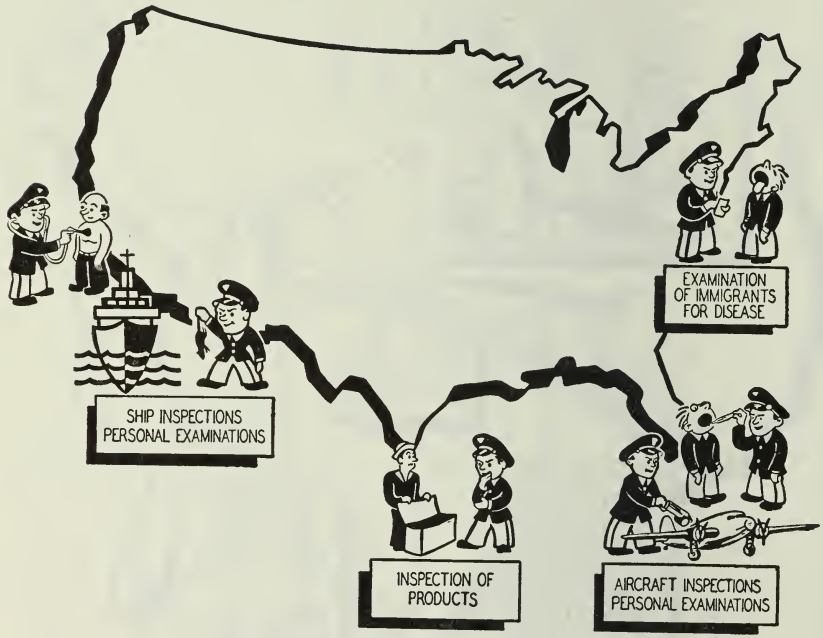

EXAMINATION OF IMMIGRANTS FOR DISEASE
SHIP INSPECTIONS PERSONAL EXAMINATIONS
INSPECTION OF PRODUCTS
AIRCRAFT INSPECTIONS PERSONAL EXAMINATIONS

FIGURE 8—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—The Federal Government Functions Directly for Prevention of Disease From Abroad

Protection of this country from the importation of quarantinable diseases from abroad is a direct service of the Federal Government. Control is exercised by means of medical examination of all persons from foreign areas, inspection of ships and planes for sanitary conditions, inspection of products entering the country, and imposition of quarantine restrictions when necessary.

A GUIDE TO HEALTH ORGANIZATION IN THE UNITED STATES[1/2]

By

JOSEPH W. MOUNTIN, Medical Director, and
EVELYN FLOOK, Administrative Analyst
United States Public Health Service

At each of the three levels of government, Federal, State, and local, health functions are distributed, without common design, among agencies having a wide variety of major interests and responsibilities. Even the initiated may be confused by the break in continuity of authority and responsibility occasioned by political boundaries which otherwise have little significance in the lives of people. To a person unfamiliar with a federated system of government, contradictions and exceptions seem to characterize the broad scheme of organization—if, in the mosaic, they are able to perceive any coherent pattern.

There is wide variation in the definition of public health, and this is reflected especially in the structure of local health organizations. In many of their operations, health departments seem to stop somewhere short of applying remedial measures. Finding a condition needing attention and bringing it to the notice of the person concerned seems, on superficial examination, to be the end and purpose of public health. The visitor from abroad has difficulty understanding why public health agencies should be divorced from such elemental health measures as removal of refuse, public housing, and various items falling within the general scope of public services.

In the field of medical care the picture is equally confusing. A complete tax-supported service is provided by the Federal Government for the Indians and for veterans of wars, but medical benefits for its own workers are limited to disabilities arising out of employment. The States usually provide domiciliary care for the insane and the tuberculous, but for no others. Localities differ widely in the provision of general medical

[1] From the States Relations Division, Bureau of State Services.

[2] While compilation of the factual material for this article was completed on December 31, 1945, in some instances the most current information available had been collected several years prior to that date. Subject matter covering Federal health organization has been corrected to include provisions of Reorganization Plans No. 2 and No. 3 of 1946, under authority of the Reorganization Act of 1945.

service, but they are alike in confining such provisions to the indigent. Except for limited medical services under workmen's compensation, there is no Federal, State, or local official system of compulsory sickness insurance.

One should not draw the conclusion that if a given service is not performed by the health department it is neglected. A study limited to official health organizations in the United States discloses only a fraction of the total health effort. For example, hospitals of various medical types are apt to be operated by departments of welfare; activities for improvement of sanitation are engaged in by departments of public works; control of animal diseases transmissible to man is a responsibility of departments of agriculture; and housing agencies play their part in the over-all health picture. Perhaps the largest part is arranged by the individual as a matter of course in his daily life. He may be guided in a remote way by the health department; more often he draws on his own basic understanding of hygiene. This is possible because the great mass of the population lives in an environment where sanitation has reached a fairly advanced stage of development. Even commercial agencies render substantial support to the public health by the development and sale of sanitary appliances. Improved methods for the production, processing, and preservation of foods have done much to lessen intestinal disturbances. The fact that public health has in large measure become automatic speaks well for the work of health agencies and in no way detracts from their importance in the total public health program.

Should a person feel the need of medical attention, his first thought is to employ a private physician, and, if necessary, seek hospitalization. Voluntary systems of insurance, a sliding scale of charges, and a measure of public assistance, alone, or in combination, serve to ease the financial burden for the individual. Despite inequalities usually associated with medical and hospitalization services that operate on the basis of a private enterprise, in this country, the great majority of the people obtain a considerable measure of medical care, at least for the more acute conditions.

When the general scheme of health organization is first explained, the visitor or the casual observer often is amazed that it works at all. But it does work, even though at times the processes may seem cumbersome and inefficient. Its high performance is well demonstrated by rather obvious and tangible results. The people of the continental United States now enjoy a level of health and well-being never before attained by any population of comparable size. The trend of both individual and community health has been consistently upward for many years. This upward trend should continue as better methods are devised and given wider application.

The foregoing observations should not be construed to mean that health services in the United States operate without some basic form, even though they are contributed by a multiplicity of agencies. The general plan of health organization in any country must be woven into the framework of government. Also, social policy and tradition determine which problems may be left to the individual, the sphere for voluntary cooperative activity, and which services shall be performed by government either with or without some measure of compulsion. The purpose of this pamphlet is to describe what exists and not to indicate how it might be improved.

From a purely legalistic standpoint, the three levels of government—Federal, State, and local—represent distinct and separate entities. Actually, they constitute a partnership for the protection and promotion of human health. For the most part, the scope of responsibility of all official agencies participating in health work is founded in statutory authorization. Designated agencies of each governmental level are held accountable by specific laws for one or more of the following functions: direct service, regulatory work, popular health instruction, administration of financial grants-in-aid, loan of personnel, or conduct of investigations and demonstrations. From the cooperative effort of Federal, State, and local governments, of voluntary agencies, and of private practitioners, there is woven the total fabric of health service in the United States.

FEDERAL HEALTH ORGANIZATION[3]

Federal agencies contributing to the improvement of human health are, in general, concerned with participation in research, investigations, and demonstrations; administration of grants-in-aid; and regulation of health problems incident to movement of persons and things in foreign and interstate traffic. They study the cause, prevention, and treatment of disease and demonstrate results of their findings to selected communities; make financial grants to States for expansion and improvement of health services administered by either State or local agencies; and exercise the controls necessary to prevent spread of disease from one State to another or from other countries to the United States. Less extensively, Federal functions also include loan of personnel for special or emergency situations and performance of direct service for selected conditions or under particular circumstances.

[3] Material in this section is based largely upon the United States Government Manuals, 1944, 1945, and 1946(1) supplemented by information from other official publications as indicated by bibliographic reference.

693409—47—3

Federal Security Agency

Major health functions of the Federal Government are carried on by constituent units of the Federal Security Agency. The first step toward grouping several governmental units with a mutual interest in the related fields of health and welfare was taken when the Agency was established for that purpose under Plan No. I of the Reorganization Act of 1939 (2). In 1940, Plans No. II and No. IV brought together under the same administration additional Federal organizations operating in some field of health. Under the most recent reorganization plan, which became effective July 16, 1946, there has been still further consolidation of Federal agencies engaged in health activities. The specific health functions of each component unit of the Federal Security Agency may be summarized as follows:

United States Public Health Service

The United States Public Health Service is the principal Federal health agency. It engages in extensive health programs in cooperation with States, other Federal agencies, governments of foreign nations, and international agencies. Its affairs are administered by the Surgeon General and assistant surgeons general in charge of designated administrative bureaus, to which are delegated specific functions by the Surgeon General. Officers of the Regular Corps of the Public Health Service are commissioned by the President, with the advice and consent of the Senate, after passage of an examination given according to professional category in the several branches of medicine, dentistry, sanitary engineering, pharmacy, nursing, or related scientific specialties in the field of public health. The commissioned Regular Corps is supplemented by a reserve corps which may be activated in an emergency. Some specialized professional positions, as well as custodial, clerical, fiscal, and many of the administrative positions are filled by civil-service employees.

The principles of cooperation and assistance are observed by the Public Health Service in most of its functions, largely exercised through demonstrations, advice on technical matters, and loan of officers to State and local health departments and to other Federal agencies with particular health interests. The greatest assistance is given through financial grants to State and Territorial health agencies for expansion and improvement of their programs. The relationship between the Public Health Service and State health organizations is exceedingly close.

The broad powers and duties of the Public Health Service are delineated in the Public Health Service Act of 1944 and amendments thereto (3). Outstanding functions of the Service are listed at this point:

1. Study of the causes and means of propagation and spread of the diseases of mankind, and the development of methods of prevention

and control. In this work the Public Health Service maintains several research laboratories, chief among which are those of the National Institute of Health, including the National Cancer Institute. In addition to investigations carried on at the Institute and its field stations, financial assistance is given through research grants to universities, laboratories, and other public and private institutions for research projects, upon recommendation of Service advisory councils. Funds are also available for research fellowships, both in the Institute and in various university medical schools.

2. Maritime quarantine and inspection of passengers and crews of vessels and airplanes arriving from foreign ports, for protection of the country from the importation of quarantinable diseases from other countries. Examination of immigrants for detection and isolation of persons suffering from mandatorily excludable disease. Medical inspection of aliens is performed in collaboration with the Immigration and Naturalization Service of the Department of Justice.

3. Interstate quarantine for prevention of the spread of diseases from State to State. The Federal health agency prescribes conditions under which persons and things may move in interstate commerce. It assists States in controlling epidemics and may, on request, take complete charge of serious outbreaks. Regulation of conditions existing within the boundaries of a particular State is a duty that remains under State jurisdiction.

4. Dissemination of public health information, including collection and publication of reports of disease prevalence in the United States and foreign countries, and other pertinent information regarding conservation of the public health.

5. Assistance, through grants to States, counties, cities, and health districts, in establishing and maintaining proper sanitation facilities, general public health services—including industrial hygiene, mental hygiene, and cancer control—and special programs for the control of the venereal diseases and tuberculosis. Grants made under this authority represent the actual transfer of funds from Federal to State treasuries for employment and training of personnel for State and local health work, purchase of supplies and equipment, provision of appropriate facilities for care and treatment of designated illnesses, and payment of general operating expenses. Services include the loan of personnel for temporary duty, and the provision of consultation and advice to State and local health departments. Assistance is also furnished States in the development of hospitalization plans and construction of hospital and allied health facilities.

6. Supervisory control and licensure of the manufacturers of biological products — vaccines, serums, toxins, antitoxins, arsenicals, and similar preparations — used in the prevention and treatment of diseases. This control has been established to insure safe and standard products.

7. Study of mental diseases and drug addiction and investigation of legitimate needs for narcotic drugs.

8. Provision of hospitalization, general medical and dental care, and preventive health services for American merchant seamen, members of the United States Coast Guard and the Coast and Geodetic Survey, and for other legal beneficiaries of the Service. In this connection, the Service operates 26 marine hospitals and 120 other medical relief stations and contracts for service with 133 hospitals located in places not served by marine hospitals. It assigns medical and dental officers to ship duty to provide medical and dental care at sea for the Coast Guard and Coast and Geodetic Survey. The Public Health Service, in cooperation with the Bureau of Prisons, also maintains a medical and health program in Federal prisons. The medical division of the Office of Indian Affairs, the agency charged with administration of medical care and public health services for Indians, is staffed by Public Health Service officers on detail to that organization.

9. Operation of special hospitals—the National leprosarium and two hospitals specifically for the care of mental patients and persons addicted to the use of narcotics.

10. Administration of a wartime nurse training program in accordance with provisions of the Bolton Nurse Training Act (4). This Law provided for recruitment and training of nurses through grants to institutions providing training for students in basic nurse education, refresher courses, and in postgraduate education, including intensive short courses. (Recruitment ended immediately after VJ Day, 1945, and enrollment ceased after October 15, 1945 in accordance with instructions from the President and the Congress.) Students participating in the training program enrolled on or before October 15, 1945 may complete their course under the Federal scholarship.

11. Cooperation with other Federal agencies in discharging their various health functions, through assignment of personnel for assistance.

12. Participation in the organization and subsequent functioning of international health organizations. In carrying out this service,

particular attention is given to the direction of programs for the exchange of international health and related personnel and supervision of health missions to foreign countries.

13. Collection and publication of data on vital statistics (5), which are basic materials for public health programs and give valuable information concerning public health trends. Through measurement of death rates from different causes, the progress of health programs directed toward reduction of particular diseases or conditions can be evaluated.

St. Elizabeths and Freedmen's Hospitals

St. Elizabeths Hospital (6) is the principal hospital for treatment of mentally ill civilian beneficiaries of the Federal Government. Freedmen's Hospital (7) is a general hospital with specialized departments. It is affiliated with the Howard University Medical School. Both of these hospitals are under the direction of the Surgeon General of the United States Public Health Service.

Children's Bureau

From a dimensional standpoint, the Children's Bureau perhaps ranks next to the United States Public Health Service as a Federal agency engaged in health activities. Under authority of title V, part 1, of the Federal Social Security Act of 1935 (8), the Children's Bureau was made responsible for allotment of Federal funds to the States for the purpose of enabling each State to extend and improve health services available for mothers and children. These funds are used to assist in the support of prenatal and postnatal clinics, of demonstration delivery services, of well-child conferences, and of public health nursing services for maternity and child health supervision. Through these grants, dentists and nutritionists are also employed by States and localities for services to mothers and children who attend the clinics.

During the recent war this program has been expanded to provide maternity care for wives and pediatric care for infants of enlisted men in the four lowest pay grades of each branch of the armed forces. This Emergency Maternity and Infant Care program is financed by special appropriation, but within the framework and under the general authority of title V of the Social Security Act.

A cooperative Federal-State program of services for crippled children is also sponsored by the Children's Bureau under authority of title V, part 2, of the Social Security Act (8). This program, like the one for extension of general health services to mothers and children, is based on Federal grants to the States. However, the health department is not always the State agency responsible for administration of the program for crippled children. In addition to health departments, State agencies

with which the Children's Bureau cooperates in administration of programs of service for crippled children are: departments of welfare, departments of education, special crippled children's commissions, and State university hospitals. The Children's Bureau consults with the State agencies in the development of their programs and provides them with the advisory service of nationally recognized leaders in the professions involved. Federal grants earmarked for crippled children's services are used for locating crippled children; for providing medical, surgical, corrective, and other services and care; and for obtaining facilities for diagnosis, hospitalization, and aftercare of children who are crippled or who are suffering from conditions that lead to crippling.

United States Office of Education

By participation in workshops for the training of teachers, the United States Office of Education (9) stimulates public health education and school health programs, since classroom teachers hold a key position for dissemination of accurate information regarding health matters. School health programs sponsored by the Office of Education tend to combine instruction in health with instruction in safety and with physical education activities. Some research is conducted by this agency to obtain information concerning the effect the physical plant of the school has upon the health of children. Medical examination of school children and teachers and school lunch programs are also subjects of investigation and recommendation. Through the grant-in-aid program for vocational education administered by this agency, training for health personnel below college grade has been provided. Outstanding among such groups are laboratory aides and technicians and practical nurses.

Office of Vocational Rehabilitation

The comprehensive program of the Office of Vocational Rehabilitation (10) covers, in addition to its strictly vocational features, medical diagnosis and physical restoration, including hospitalization, of permanently disabled civilians.

Social Security Administration

Through its several programs of financial assistance, the Bureau of Public Assistance of the Social Security Administration (11), in cooperation with State and local official welfare agencies, indirectly bears some of the medical costs of three designated needy groups, persons eligible for old-age assistance, dependent children, and those who are blind. Purposes for which a person may receive assistance include such essentials as food, shelter, clothing, replacement of household furnishings, and costs of anticipated medical care. However, in determining the amount of assistance to which clients of these programs are entitled, no allowance is made for costs of unpredicted illnesses.

Research in the administrative aspects of health and medical care is engaged in by the Social Security Administration's Bureau of Research and Statistics. Reports of the studies made by this bureau have been a significant factor in demonstrating the need for extension of some health services now operating and for organization and establishment of additional types of services.

Food and Drug Administration

The Food and Drug Administration (12) is the main Federal organization which safeguards the quality of foods and drugs. Activities of this agency are directed chiefly toward promoting purity, standard potency, and truthful and informative labeling of commodities covered by the Food, Drug, and Cosmetic Act (13), the Tea Act (14), Import Milk Act (15), Caustic Poison Act (16), and Filled Milk Act (17). Inspecting factories where foods, drugs, and cosmetics are manufactured or processed, testing samples of products covered by the aforementioned Acts, and checking the results of such tests against the labeling statements are the means employed by the Food and Drug Administration in fulfilling its law-enforcement responsibility for protecting the public against fraudulent claims concerning various foods and drugs.

Bureau of Employees' Compensation

Finally, medical and hospital care for Federal employees injured in line of duty is provided by the Bureau of Employees' Compensation (18). Such care is an integral part of the system of workmen's compensation benefits for civil employees of the Federal Government.

Federal Trade Commission

Under the Federal Trade Commission Act (19), this Commission is active in preventing improper statements for advertising foods and drugs in interstate commerce. Duties of this agency differ from those of the Food and Drug Administration with respect to advertising claims in that the Federal Trade Commission is interested in all forms of advertising, whereas the Food and Drug Administration is chiefly concerned with accuracy of statements made on package labels.

Department of Labor

Administration of the child labor provisions—including establishment of minimum age limits for employment, designation of maximum working hours for children in industry, and definition of hazardous occupations—of the Fair Labor Standards Act (20) is a function of the Division of Labor Standards of the Department of Labor. This division also promotes health and safety programs in industrial plants. Particular

emphasis is placed upon safety measures for the prevention of industrial accidents and upon general working conditions.

The Women's Bureau, another branch of the Department of Labor, prescribes working conditions affecting the health of women in industry.

In an incidental fashion, the Bureau of Labor Statistics touches upon the health of workers through receipt of reports of occupational injuries, which sometimes include illnesses. This information is not collected in the interest of health problems as such but as part of the bureau's study of many factors affecting the welfare of labor groups.

Department of Agriculture

Several branches of the Department of Agriculture participate in activities significant to human health. In this organization, too, some health functions are regulatory, some investigatory, and some carried out on a cooperative basis with State and local governmental units. The Bureau of Animal Industry (21) conducts scientific investigations of the cause, prevention, and treatment of diseases and parasites of domestic animals—many of which are transmissible to man—and directs or aids in their control or eradication. Such control is carried on in cooperation with State officials and livestock organizations through development and application of improved measures for preventing outbreaks of diseases and parasitic infestations and for controlling any that occur.

The Office of Production and Marketing Administration, another unit of the Department of Agriculture, administers a meat inspection service which is a regulatory health function. Under authority of the Meat Inspection Act (22), meat sold in interstate or foreign commerce or by firms supplying Government agencies is inspected for freedom from disease and for wholesomeness for human consumption. The Office of Production and Marketing Administration also controls insecticides through administration of the Insecticide Act (23). In addition, this office formulates official standards for various food products which serve as a yardstick for measuring gradations of quality. The Labor Branch (24) of the Office of Production and Marketing Administration finances medical care and health services for seasonal workers imported from other countries for farming communities.

The Bureau of Dairy Industry (25) engages in studies for the development of sanitary methods of handling milk on the farm, in transit, and in dairy plants. Recommendations based on the results of such studies are disseminated among dairying groups by various educational methods.

Insects, including those that affect man, are objects for both study and control by the Bureau of Entomology and Plant Quarantine (26). This bureau cooperates closely with the Public Health Service and appropriate units of the military agencies in the investigation and control of disease-bearing insects.

The Bureau of Human Nutrition and Home Economics (27) conducts research on food and other materials essential to healthful, everyday living, with special emphasis on studies of American dietary habits as related to nutrition standards. Findings from this research are made available through bulletins, press releases, radio talks, and exhibits, and through the planned educational programs conducted by extension agents throughout the country.

By means of grants-in-aid, the Extension Service (28) cooperates with State land-grant colleges in administering the educational activities of a corps of county extension and home demonstration agents located in nearly all agricultural counties. These county agents work with groups of farmers, rural homemakers, and rural youth clubs in stimulating increased production, proper conservation, and wiser utilization of food. They also serve as advisers to these groups with respect to approved methods for attaining these objectives.

Still another member agency of the Department of Agriculture, the Farm Security Administration (29), contributes to the health and welfare of low-income farmer groups by including medical and dental care among the purposes for which Government loans can be obtained through this agency. The needed medical and dental care is made available to borrower families through county-wide group health services set up by the Farm Security Administration in cooperation with local physicians and dentists. The group health services so established have recently been extended to include limited public health activities, particularly farm sanitation.

Federal Works Agency

Public construction of Government hospitals is a direct function of the Federal Works Agency (30). The grant-in-aid programs for stimulation of employment administered by this organization contribute to expansion of community health and sanitation facilities since the Federal Works Agency provides financial aid and otherwise assists in the construction and remodeling of water and sewerage works, hospitals, health centers, and other similar facilities.

National Housing Agency

Adequate housing is highly significant to community health. Functions of constituent units of the National Housing Agency, operating under authority of the National Housing Act of 1934 and subsequent amendments (31), are designed to improve existing housing facilities for low-income groups and to promote construction of new low-cost housing facilities which will meet sanitary and health requirements and maintain property values on a sound fiscal basis. Particularly is this agency

693409—47—4

concerned with expediting construction of and maintaining price control over homes for veterans. The program involves, especially, expanded production of materials; postponement of deferrable and nonessential construction; re-use of war housing; control of priorities and allocation of materials to home builders; and channeling materials into dwelling units for the low-income group. Of primary concern to the National Housing Agency is the impact of the program on existing essential sanitary utilities, and the provision of adequate utilities where existing facilities are not available.

The Federal Public Housing Authority, the branch of the National Housing Agency primarily concerned with the provision of public housing, financially aids local public housing agencies in the development and administration of low-rent housing and slum clearance. Such aid is in the form of capital loans and annual subsidies to the local housing authorities. During the war, the Federal Public Housing Authority was authorized to construct and operate family housing units or dormitories in localities where such projects were needed to meet acute shortages brought about by industrial activity essential to prosecution of the war. Infirmaries and medical care clinics were maintained and limited health programs were operated in these public housing projects. Since the war, the Federal Public Housing Authority has engaged in moving surplus war housing to points where it will better serve the housing needs of veterans.

The Federal Housing Administration, another unit of the National Housing Agency, encourages private construction, repair, and improvement of homes by offering, within a stated limit, insurance to private lending institutions on loans made to individuals or corporations. Loans secured by mortgages on residential properties are also guaranteed by this agency. Originally, mortgages were guaranteed only on one-to-four-family dwellings for sale or rent, but as a war measure security was extended to large-scale building projects constructed as homes for war workers. The Federal Housing Administration also insures loans to veterans for purchase of homes. The standards of home sanitation established by this agency must be met by all dwellings for which loans are approved.

The Federal Home Loan Bank Administration, also a part of the National Housing Agency, provides a national credit reserve for home financing institutions through the Federal Home Loan Bank System and its regional banks.

Department of the Interior

The Bureau of Mines (32) in the Department of the Interior conducts an accident prevention campaign through investigation of the causes

of mine accidents and by instructing operators and miners in accident prevention, mine rescue, and recovery work. The Bureau of Mines also conducts studies on the elimination and control of health hazards in the mineral industries.

The Fish and Wildlife Service (33) contributes to health protection by promoting programs for destruction of rodents, some of which are known vectors of disease. Detection and elimination of pollution hazards to lakes and streams are also functions of the Fish and Wildlife Service. Although the purpose of this activity is protection of fish life, corrections obtained are beneficial to humans as well.

Services of the aforementioned Federal agencies for the most part influence the health of the community as a whole. A second group of Federal agencies operates health and medical care programs that are restricted either to personnel making up the organization, or to persons whom the agency was established to serve in a general way. Such programs include consideration of health as well as other needs. In the latter category, the Office of Indian Affairs (34) of the Department of the Interior may be listed first. This office has a medical division for administering medical care and public health among the Indian wards of the Government. Operation of hospitals and general improvement of health and sanitation on Indian reservations are the principal functions of this division.

Tennessee Valley Authority

The Tennessee Valley Authority (35) maintains a medical and health service for its employees and advises communities affected by its operations. It also engages in activities for malaria and mosquito control and engages in public health education in areas served by its utilities.

United States Maritime Commission

Public health and sanitation programs of Government-owned shipyards and of other industrial facilities engaged in the construction of vessels are promoted and operated by the United States Maritime Commission (36), the agency responsible for development of the Nation's merchant fleet.

War Shipping Administration

Responsibility for operating training stations for men of the Merchant Marine was transferred to the War Shipping Administration (37) as an emergency war measure; however, the service is not of a temporary nature and is therefore included here. Health programs of the training stations include water and milk sanitation, immunization of trainees,

medical treatment for minor illnesses of the men in training, and periodic physical examination to determine their fitness for sailing. Medical care on shipboard is administered by physicians employed by the shipping company or by trained pharmacist's mates assigned to each ship. In cooperation with the United Seaman's Service, a voluntary agency, the War Shipping Administration bears a partial cost of operating rest homes for merchant seamen.

Army and Navy

Through their hospital, medical, nursing, and sanitary corps, the Army (38) and Navy (39) administer complete health and medical care programs, including hospitalization, for members of their respective forces.

Veterans Administration

The Veterans Administration (40) maintains hospital, medical, and nursing services for persons discharged from the armed forces. Primary consideration is given service-connected disabilities in the provision of such care.

Under the "GI Bill of Rights," administered by the Veterans Administration, educational opportunities of various kinds are made available to discharged veterans. Training of health personnel is stimulated through this program.

Emergency War Agencies

During the period of National Emergency still other Federal agencies were assigned by act of Congress or by Executive order specific duties having health significance in time of war. Most of these agencies, or at least their contributions to the field of health, were temporary in character. At the writing of this pamphlet, activities of several have already been drastically curtailed. These are included, however, to demonstrate the flexibility with which health organization in the Federal Government accommodates itself to unusual circumstances.

Responsibility for coordination of health, welfare, and other related activities affecting the national defense was placed in the Office of Community War Services when it was established in the Federal Security Agency (41). The primary objective of the Office of Community War Services has been to help communities in congested areas provide for families and individuals health services, medical care, recreation, education, and social protection. Since the end of the war, these activities have been somewhat reduced in scope and changed in emphasis.

TABLE 1.—*Federal agencies engaged in health work*

Participating agency	Health function	Method of administration[1]
Federal Security Agency:		
U. S. Public Health Service[2]	Maintenance of research laboratories for study of cause, prevention, and treatment of disease.	Studies and demonstrations.
	Protection of this country from the importation of communicable diseases from abroad.	Direct service.
		Regulation.
	Control of interstate quarantine and health matters involved in interstate traffic for prevention of the spread of communicable diseases among the States.	Direct service.
		Regulation.
	Public health education and dissemination of public health information.	Direct service.
		Grants-in-aid.
	Assistance in establishing and maintaining proper sanitation facilities, general public health services—including industrial hygiene, mental hygiene, and cancer control—and special programs for the control of the venereal diseases and tuberculosis.	Grants-in-aid.
		Loan of personnel.
		Studies and demonstrations.
		Advisory service.
	Assistance to States in development of hospitalization plans and construction of hospital facilities.	Grants-in-aid.
	Supervisory control and licensure of biological products used in the prevention and treatment of diseases.	Regulation.
	Study of mental diseases and drug addiction and investigation of legitimate needs for narcotic drugs.	Studies and demonstrations.
	Provision of hospitalization, general medical and dental care, and preventive health services for American merchant seamen, members of the United States Coast Guard and Geodetic Survey, and other legal beneficiaries of the Service.	Direct service.
	Operation of special hospitals (leprosarium and narcotics hospitals).	Direct service.
	Administration of a nurse training program for the basic and postgraduate education of nurses (wartime activity only).	Recruitment.
		Grants-in-aid to nursing schools.
	Assistance to other Federal agencies in the discharge of their health functions.	Loan of personnel
	Collaboration with official and nonofficial national and international agencies in matters concerned with international health problems.	Direct service.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

[2] Agencies to which U. S. Public Health Service officers are detailed for assistance in administration of the functions described.

TABLE 1.—*Federal agencies engaged in health work* (continued)

Participating agency	Health function	Method of administration[1]
Federal Security Agency (continued):		
U. S. Public Health Service[2] (continued)	Collection and publication of data on vital statistics.	Direct service. Advisory service.
St. Elizabeths Hospital	Provision of care and treatment for civilian beneficiaries of the Federal Government suffering from mental disorders.	Direct service.
Freedmen's Hospital	Provision of treatment for general and allied special illnesses of Negroes in the District of Columbia and surrounding areas.	Direct service.
Children's Bureau	Assistance to States for improvement of maternal and child health.	Grants-in-aid.
	Assistance to States for crippled children's services.	Grants-in-aid.
	Administration of maternity and infant care program for wives and babies of enlisted military personnel.	Grants-in-aid.
U. S. Office of Education	Stimulation of public health education and school health programs.	Studies and demonstrations. Advisory service. Participation in training of teachers for health instruction.
	Vocational education of practical nurses, laboratory aides and technicians, and other nonprofessional health personnel.	Grants-in-aid.
Office of Vocational Rehabilitation	Cooperation with the States in rehabilitating persons who are vocationally handicapped by permanent disability caused by accident, disease, or congenital defect.	Grants-in-aid. Advisory service.
Social Security Administration	Assistance to States and political subdivisions for general relief of three designated groups of needy clients. Such relief includes, among other provisions, allowance for predictable costs of medical care.	Grants-in-aid.
	Studies of illness and medical care.	Statistical research.
Food and Drug Administration	Stabilization of the quality of foods and drugs through inspection, analysis, and control of labeling.	Regulation.
Bureau of Employees' Compensation[2]	Provision of medical care for Federal employees injured in line of duty.	Direct service.
Federal Trade Commission	Prevention of improper advertising of foods and drugs in interstate commerce.	Regulation.
Department of Labor:		
Division of Labor Standards	Establishment of restrictions on hours, age, and kind of work for employment of children.	Regulation.
	Stimulation of health and safety programs in industrial plants.	Studies and demonstrations. Advisory service.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

TABLE 1.—*Federal agencies engaged in health work* (continued)

Participating agency	Health function	Method of administration[1]
Department of Labor (continued):		
Women's Bureau	Prescription of required working conditions affecting the health of women in industry.	Regulation.
Bureau of Labor Statistics	Collection and publication of reports of industrial injuries.	Investigations and studies. Educational work.
Department of Agriculture:		
Bureau of Animal Industry Bureau of Entomology and Plant Quarantine	Investigation and control of the cause, prevention, and treatment of diseases and parasites of domestic animals and of insects affecting man.	Studies and demonstrations. Payment of indemnities. Regulation.
Office of Production and Marketing Administration—Livestock Branch	Inspection of meat sold in interstate and foreign commerce, establishment of standards for various food products, and control of insecticides.	Regulation.
Labor Branch	Provision of medical and health services for seasonal workers imported by this office for aid in harvesting food crops.	Direct service.
Bureau of Dairy Industry	Promotion of dairy industry and development of sanitary methods of handling milk.	Direct service. Studies and demonstrations.
Bureau of Human Nutrition and Home Economics	Conduct of research on food and other goods essential to healthful everyday living and dissemination of information obtained.	Direct service. Studies and demonstrations.
Extension Service	Stimulation of increased production, proper conservation, and wiser utilization of food through education of rural population groups.	Popular education.
Farm Security Administration[2]	Operation of a medical care program among low-income farmer groups..	Grants-in-aid. Loans to individuals.
Federal Works Agency	Development of employment programs through construction projects which include the building and remodeling of health facilities and hospitals.	
	Construction of government hospitals and health facilities.	Grants-in-aid. Direct service.
Department of the Interior—Bureau of Mines:		
Health and Safety Service	Investigation of causes of mine accidents and instruction in accident prevention and mine rescue and recovery work.	Studies and demonstrations.
Fish and Wildlife Service	Promotion of programs for destruction of rodents. Detection and elimination of stream pollution hazards.	Popular education. Direct service.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

[2] Agencies to which U. S. Public Health Service officers are detailed for assistance in administration of the functions described.

TABLE 1.—*Federal agencies engaged in health work* (continued)

Participating agency	Health function	Method of administration[1]
Department of the Interior (continued):		
Office of Indian Affairs[2]	Administration of medical care and public health among Indian wards of the Government.	Direct service.
National Housing Agency[2]:		
Federal Public Housing Authority[2]	Financial assistance to local public housing agencies in the development and administration of low-rent housing and slum clearance.	Grants-in-aid..
Federal Housing Administration	Insurance of loans made by private lending institutions for repair or improvement of existing homes and for building of new dwellings	
	Guarantee of mortgages. Insurance of loans to veterans for purchase of homes.	Direct service.
Tennessee Valley Authority[2]	Malaria and mosquito control.	Direct service.
	Maintenance of a medical and public health service for employees and an advisory health service to communities affected by operations of the organization.	Direct service. Advisory service.
U. S. Maritime Commission[2]	Promotion of public health and sanitation programs in shipyards and industrial facilities under its control.	Direct service.
War Shipping Administration[2]	Operation of health and sanitation program at training stations for men of the merchant marine.	Direct service.
War Department:		
United States Army[2]	Operation of health and medical care program for all Army personnel.	Direct service.
Department of the Navy:		
United States Navy[2]	Operation of health and medical care program for all Navy personnel.	Direct service.
Veterans Administration:		
Medical and Hospital Service	Maintenance of a complete medical care program, including hospitalization, for former members of the military and naval forces.	Direct service.
Vocational Rehabilitation and Training Division	Provision of training for persons discharged from the armed forces. Through this program, more trained personnel will be made available for health work.	Direct payments for training.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

[2] Agencies to which U. S. Public Health Service officers are detailed for assistance in administration of the functions described.

The War Relocation Authority (42) of the Department of the Interior as part of its program of relocating Japanese and other war-affected groups maintained a medical care and public health program.

The Committee for Congested Production Areas (43) stimulated public health and sanitation programs in selected war areas.

The Office of Civilian Defense (44) established medical services for use in the event of enemy action affecting the civil population.

Arrangement for special research and development in medical and public health fields associated with national defense and prosecution of war is a function of the Office of Scientific Research and Development (45).

The Selective Service System (46) through data collected in its physical examinations of draftees has made information available concerning the health status of the population. These facts and figures have been used as a basis for planning more intensive health programs of particular types.

The War Food Administration (47) instituted an extensive nutrition program throughout the United States.

Agencies with International Health Functions

Since political interests in general are now international as well as domestic in scope, health interests have expanded accordingly. The Federal Government, recognizing its responsibility for assisting in international health programs has delegated various aspects of this cooperative work to the State Department (48), the Office of Inter-American Affairs (49), the Pan American Sanitary Bureau (50), and the Anglo-American Caribbean Commission (51). In the United States Public Health Service there has been established an office of International Health Relations.

For ready reference a tabular presentation (Table 1) identifying the Federal agencies participating in health work, designating the range of activity of each, and specifying the main pattern of administration is included. Those to which Public Health Service personnel are detailed are denoted by footnote. In this tabulation, agencies having war time emergency functions only are omitted.

Cost of Federal Health Services (52)

It was thought that appropriations made by Congress to the respective Federal agencies for the health services described would furnish one tangible expression of the magnitude of the several programs. However, since the health activities of most agencies other than the Public Health Service are so closely interwoven with functions that have no particular health significance, the number of agencies is limited for which appropriations chargeable to health could be isolated. This fact in itself demon-

693409—47—5

strates the difference between health programs that are organized as such and activities that have only an incidental influence upon health. Appropriations to the main Federal health agency, the United States Public Health Service, for the fiscal year 1945 totaled approximately $138,309,000 for its broad health program. Of this amount, grants to States for health services of various kinds and training of nurses represented the two leading items of expense. The Labor Department received nearly $78,782,000 for carrying on its general health services for mothers and children, crippled children, and emergency maternity and infant care. This, of course, was prior to transfer of the Children's Bureau to the Federal Security Agency. Over $6,588,000 was appropriated to the Department of the Interior for designated health and safety services. About $3,287,000 was allotted to the Food and Drug Administration. The entire program of this agency has a distinct bearing upon health. St. Elizabeths Hospital received an appropriation of $2,606,000 and Freedmen's Hospital, $829,000. Other Federal agencies engaging in activities related to health support them out of funds which cannot be identified.

Review of the method of administration employed by the various Federal agencies engaged in health services reveals that for the most part direct Federal service is restricted to selected groups of beneficiaries. Services that are set up for the community as a whole are usually channeled to the recipient through agencies of State and, in some instances, local government. Such avenues of approach find a parallel in the general plan of government in the United States. When Federal services reach the individual client by an indirect rather than a direct route, Federal responsibility is usually discharged through grants-in-aid. In exercising regulatory control, Federal agencies may pursue their own enforcement activities or they may cooperate with State authorities. It is necessary, therefore, that one have an understanding of State organization for health services before he can fully comprehend the ultimate workings of Federal agencies.

STATE HEALTH ORGANIZATION

Within a single State, health services may be dispersed among numerous separate agencies of State government. Among the 48 States, this number is multiplied many times over, since there is no common assignment of functions or responsibilities to a particular agency. With few exceptions there is little evidence that the pattern established in the Federal government for allocation of duties in the field of health has influenced to an appreciable extent the apportionment of authority among State agencies. The State is sovereign within the governmental system of

the United States; therefore, it has inherent police power. It is from this power that authority to engage in health work chiefly originates.

Every State has one particular agency, usually termed the department of health, which is charged with the over-all health program. The fields of operation of State health departments vary tremendously because different degrees of responsibility for specific health activities may be assigned to other agencies of State government. According to a study made by the United States Public Health Service in 1940 (53), separate agencies of State government participating in some form of health activity total 48. In a number of cases, terminology rather than nature of organization represented the primary difference in designation. After those having common characteristics were combined, there remained 16 distinct types of agencies and several miscellaneous branches of State government which were engaged in service having some bearing upon the health of the community. A list of these different types of agencies follows:

Department of health

Department of welfare, social security, emergency relief, general assistance, etc.

Department of agriculture

Department of labor, labor and industry, labor and immigration, etc.

Department of education, public instruction, etc.

Special boards, commissions, or independent offices established specifically for the activity indicated (tuberculosis board or commission, cancer commission, workmen's compensation commission or bureau, industrial accident board, dairy and food commission, hotel commission, livestock sanitary board, water resources board, commission for the blind, crippled children's commission, mental disease commission or department, State toxicologist, State veterinarian, etc.)

Board of control, board of affairs, department of State institutions, etc.

Independent State hospital, independent State laboratory

Department of conservation

State university or college

Department of mines and minerals

Department of engineering, department of public utilities

State experiment station

Independent licensing and examining boards

Department of motor vehicles, department of public safety

Department of civil service and registration, department of registration and education

All types of agencies do not function in all States; neither do they always participate similarly in places where they do operate. A few summary statements will give some insight into a situation on which it is difficult to generalize because of the number of exceptions that are found to any conclusion that is drawn. However, since this pamphlet is designed for quick reference, exhaustive analysis is not contemplated, and an effort will be made to present the general picture rather than to play up exceptions. Participation in health work by a multiplicity of agencies does not necessarily imply that each of them has major responsibility for some particular health program. More often, agencies other than the health department function as contributory bodies responsible for specific segments of the broader programs sponsored by the State health agency. For instance, in all States the health department is officially charged with control of general communicable diseases; yet, through their school systems, the departments of education of a number of States conduct educational programs in communicable disease control. In a few States, this same agency has certain law enforcement powers with respect to acute communicable diseases among school children. Moreover, hospitalization for communicable disease patients is furnished by the State university hospitals of at least a half dozen States. Except for the provision of medical and institutional care, the health department usually assumes leadership and guidance in the operation of any program for which it has some portion of responsibility.

The pattern of administration ranges from regulatory functions only, or advisory service only, to operation of complex direct service units. Greatest divergence is noted in the portion of responsibility borne by the State agency and the portion delegated to local political subdivisions. Practically all States have at least the authority for control of epidemics. Usually State regulatory authority is broader, and in many instances the State delegates its power to local agents for enforcement. In one instance, State assistance is limited to advice, supervision, or promotion. In another, the State agency actively engages in direct service. In still another, the first plan is followed for some activities and the second for others, or the first by some participating agencies and the second by others. Distribution of financial aid from State as well as from Federal sources for approved projects is also a form of State participation now in common use.

Perhaps because of the greater number of activities encompassed, or perhaps because of the influence of Federal grant-in-aid programs, the State health department is more apt to utilize all of the methods enumerated in administration of its complete program than any other type of State agency participating in health work. Regulatory powers are directed especially toward the control of communicable diseases and the improvement of sanitation. Stimulation of more adequate local health service is accomplished through the promotional, advisory, and supervisory functions of the State health department. Thus the State agency furnishes guidance to local health personnel in their operations and tends to establish some stability of service throughout the State.

Health functions of departments of welfare, education, and agriculture may also be administered directly or indirectly through local counterparts of the State agency. In departments of welfare, for example, institutional care of any kind is usually a direct State service. On the other hand, medical care of the needy in home or office is rarely administered directly by the State except for selected groups, such as designated categories of relief clients. Instead, the State agency extends financial aid to local political subdivisions which, in turn, arrange for some sort of direct service. When crippled children's programs fall within the jurisdiction of the welfare department, some of the services furnished are directly State-operated or financed, whereas others are locally administered, but State-subsidized.

In the few States where provision of school health service is a function of the State department of education, activities are directly administered by local school boards, with supervision and financial assistance from the parent body. In States where crippled children's services are assigned to the department of education, rather than to the department of health or welfare, essentially the same split occurs between State-operated and State-aided portions of the program.

TABLE 2.—*Relative frequency with which designated types of State agencies have major responsibility for specified health activities*

Activity	State agency chiefly responsible*														
	Department of health	Department of welfare	Department of agriculture	Department of labor	Department of education	Special board or commission	Department of institutions or board of control	Independent State hospital	Department of conservation	State university or college	Department of engineering or public utilities	Independent licensing or examining boards	Department of registration and education or civil service	Other departments or offices of State government	No State program in operation
Public health and preventive services:															
Acute communicable disease control	48														
Tuberculosis control—(field services)	44	1				2	1								
Venereal disease control	48														
Malaria and mosquito control[1]	23														25
Sanitation of water supplies	47										1				
Sanitation of sewerage systems	44					3								1	
Sanitation of bathing places	46														2
Sanitation of hotels and camps	35		5	2		2			1	1					2
Shellfish sanitation[1]	19		1						1						27
Milk sanitation	34		11			3									
General food sanitation	25		17			3			1	1				1	
Purity, potency, and labeling of foods and drugs.	25		18			4			1						
Industrial health services	37			2											9
Plumbing control	14					4							1		29
Housing	4			4		8								5	27
Rodent control and control of garbage collection and disposal.	25														23
Maternity-child health activities	48														
School health services	43				4										1
Public health nursing	48														
Dental services	37				1		1								9
Health education	48														
Nutrition	42														6
Statistics and vital records	47													1	

See footnotes at end of table.

TABLE 2.—*Relative frequency with which designated types of State agencies have major responsibility for specified health activities*—Continued

Activity	State agency chiefly responsible*														
	Department of health	Department of welfare	Department of agriculture	Department of labor	Department of education	Special board or commission	Department of institutions or board of control	Independent State hospital	Department of conservation	State university or college	Department of engineering or public utilities	Independent licensing or examining boards	Department of registration and education or civil service	Other departments or offices of State government	No State program in operation
Public health and preventive services: (Cont.)															
Laboratory service	48														
Medical and custodial care:															
General illness[2]		24					1	1		5					17
Tuberculosis	16	8				8	13							1	2
Mental disorders		12				3	24	9							
Cancer	10					3		1		8					26
Crippled children	22	12			5	6	1			2					
Workmen's compensation				14		33									1
Licensure:															
Members of the healing arts—															
Physicians	9				2							32	5		
Osteopaths	6				2							33	5		2
Chiropractors	5				1							34	5		3
Optometrists	5				2							36	5		
Nurses	3				4							36	5		
Dentists	3				2							38	5		
Dental hygienists	2				2							19	2		23
Pharmacists	2				2							40	4		
Others	6				2							20	5		15
Embalmers and/or funeral directors	8											35	5		
Midwives	18				1							8	2		19
Hospitals and/or other health facilities	28	6					1								13

*This tabulation is based primarily on information reported to the Public Health Service by authorities of State governments in 1940 in connection with the study, "Distribution of Health Services in the Structure of State Government" (53). However, more recent data have been substituted whenever available.

[1]Of sectional concern only.

[2]For indigents or categorical relief groups only. There are no State programs of general medical care for the public-at-large.

Primary functions of the State department of agriculture with respect to milk and food sanitation may be described as regulatory; secondary functions, as direct service (laboratory determinations and inspections of dairy herds and farms, pasteurization plants, food stocks, and food-handling establishments); and tertiary functions, as indirect service (advice to local authorities concerning conditions requiring local action). Contributions to the health of the general public by most other agencies of State government are in the form of direct rather than indirect service.

Marked variability occurs among the States in assignment of responsibility for operation of the many activities that make up a total health program. Therefore, State organizational patterns for health work can be traced better by indicating the frequency with which a particular type of agency is charged with a specific health function than by attempting to enumerate for the entire country the different combinations of health responsibility for any type of State agency. Table 2 has been constructed to show in a general way the relative frequency with which designated types of State agencies are given primary responsibility for performance of specific health functions. For this chart, subordinate contributions of collaborating agencies have not been considered; consequently, the number of State agencies represented is appreciably smaller than it would be if participation in each aspect of a given program were included.

Functions significant to health have been grouped under four headings, several of which are subdivided. Classification headings are:

Public health and preventive services
Medical and custodial care
Workmen's compensation
Professional licensure

Public Health and Preventive Services

Only one-fourth of the twenty-four public health and preventive services listed are invariably lodged in State health departments. Approximately the same number are usually found there. When activities of the latter group are placed elsewhere, usually they are distributed in this manner: registration and preservation of vital statistics are delegated to the office of Secretary of State; school health services to the department of education; field services for tuberculosis control are an extension of sanatorium functions, the institutions being administered either by the department of welfare, a special tuberculosis board or commission, or a department of institutions; and sanitation of water supplies and sewerage systems to a department of engineering, department of public utilities,

or sanitary water board. Occasionally, the department of agriculture rather than the department of health is responsible for sanitation of hotels and camps, and sometimes authority for such control is centered in a department of conservation, department of labor, special board or commission, or State university. While industrial health services are performed by the health departments of more than three-fourths of the States, they are a function of a few departments of labor and in some instances no State agency operates an industrial hygiene program as a distinct entity. Dental services, usually provided by the health department, are largely restricted to children. In a number of States, even limited dental programs have not been inaugurated on a State-wide basis.

Milk sanitation, general food sanitation, and control of foods and drugs for purity and potency are required of State health departments frequently (by more than half but less than three-fourths of the States). Fairly often, departments of agriculture are charged with milk sanitation and control of foods and drugs; occasionally special boards or commissions have been established for handling these activities; and infrequently these duties are assigned to the department of conservation. Exceptions to this general pattern may be determined from table 2. Since rodent control and control of garbage collection and disposal are usually localized, these programs frequently are not operated by State agencies. When State health departments do participate, they exercise a general supervision rather than an intimate control, and place special emphasis on recommended standards of practice. Regulation of plumbing installations is not a State-wide function in more than half of the States. When it is, authority is primarily exercised through establishment of standards, approval of plans, or issuance of permits and is delegated to the health department more often than to other types of agencies. Occasionally, there are special boards or commissions operating for this purpose. Because of geographic characteristics which minimize these particular problems in a number of States, there is frequently no State activity for malaria and mosquito control or for shellfish sanitation.

The need for low-rent housing that will provide the minimum essentials for decent and healthful living has been recognized. Forty States have enacted legislation authorizing the creation of local housing authorities to construct and operate low-rent housing in cooperation with the Federal Government (54). Eleven of these States have either established a special housing authority as an administrative branch of their State government or have designated a division of some existing agency in State government to be officially responsible for an organized housing program. Ten additional States, usually through their health department or department of labor, informally engage in miscellaneous activities for improvement of existing housing.

693409—47—6

Medical and Custodial Care

State arrangements for medical and custodial care depend largely upon the condition or illness involved. All States assume responsibility for care of the mentally ill, but only rarely is such care a health department function. Agencies administering State mental hospitals are more likely to be departments of welfare, departments of institutions, or boards of control. Occasionally, State mental hospitals operate independently of any central administrative body. On the other hand, hospitalization of the tuberculous and of crippled children are often health department functions. In a number of States, the same agency operating the mental hospitals also administers the medical care program for crippled children and hospitalizes the tuberculous. Approximately half of the States have no organized program for cancer treatment. In the other half, health departments and State university hospitals have assumed leadership in providing care for cancer patients. Medical care for general illnesses is not available for the public-at-large in any State. However, about half of the States furnish some measure of medical care for designated relief groups. Such provisions range from fairly comprehensive programs for all indigents to extremely limited services for recipients of old age assistance or of aid for dependent children. A few States operate a system of charity hospitals, and several more supply financial aid to voluntary hospitals accepting patients who are unable to pay the regular fee.

Workmen's Disability Compensation

Some sort of official program for workmen's compensation for disability is operated in all but one State. In about half the States, compensation covers industrial accidents only. In the other half, selected occupational illnesses as well as accidents are compensable. The department of labor administers workmen's compensation activities in nearly one-third of the States. In the others, an industrial commission, industrial accident board, or workmen's compensation commission is responsible. Besides approving settlements, adjudicating disagreements, and, in some instances, awarding benefits, a few States have developed uniform plans for providing medical and hospital service to their injured employees.

Professional Licensure

Licensure of physicians, dentists, other members of the healing arts, nurses, midwives, and embalmers and funeral directors is a responsibility of specialized licensing and examining boards more often than it is a function of an administrative agency of State government. Osteopaths, chiropractors, dental hygienists, and midwives are not recognized by all States as licensed practitioners. There is a marked trend toward place-

ment of hospital licensure under the jurisdiction of State health departments.

Cost of State Health Services

Inasmuch as current data on expenditures of the various agencies of State government for each of the health functions listed could be obtained only by personal visits to the many agencies involved, cost information has been omitted from this elementary guide. However, those who wish may find expenditure figures for the year 1940 given in the "Distribution of Health Services in the Structure of State Government" (53). Summary figures on expenditures are repeated as tables 1 and 2 of appendix A. Some health programs have expanded appreciably since that time; yet, on the whole, the figures there presented are indicative of the relative magnitude of the numerous activities making up the State's total fabric for health protection and of the contribution of each type of State agency.

LOCAL HEALTH ORGANIZATION

General Characteristics of Local Government

For an understanding of the several patterns of local health organization, it is necessary to have some insight into the complexity and diversity of the structure of local governmental jurisdictions. While the State is a sovereign unit in the governmental system of the United States, it has delegated to counties, municipalities, townships, and other local governmental units certain functions in the discharge of which the local political subdivisions may be quite autonomous. The authority of local governmental units may be defined in the State constitution, acts of the legislature, or charters. Local ordinances and regulations serve to implement this basic authority. Throughout the continental United States, there are approximately 38,000 units of local government having "a legally authorized organization and governing body, a separate legal identity, the power to provide certain public or governmental services, and a substantial degree of autonomy including legal and actual power to raise at least a part of its own revenue" (55). These local units constitute divisions of the Nation's States for general governmental purposes and do not include over 125,000 school and other special-purpose districts which cut across and overlap the 38,000-odd multifunctional units.

In order of area, the county is the major subdivision of a State. There are, in all, 3,070 counties[4] in the United States. The remaining 35,000

[4] Of the 3,070 actual counties in the United States, 9 (San Francisco, Calif.; Denver, Colo.; New Orleans, La.; Philadelphia, Pa.; and the 5 counties making the city of New York) are conterminous with cities. In addition, 24 cities in Virginia; Baltimore, Md.; and St. Louis, Mo.; function independently of any county but are not included in the count. The District of Columbia and Yellowstone National Park are excluded, likewise, because they do not have regular county status.

units of local government are minor subdivisions of the counties, frequently referred to as minor civil divisions. These, in turn, are of two classes: 1, Special incorporations in urban or partly urban places for the general purposes of local government and services, and 2, subdivisions of the county in rural areas for local purposes. Units of the latter class form the "town" or "township" system of government and exist in 22 States, notably the New England section, a few Middle Atlantic States, and part of the midwestern States. In New England and in the vicinity of large cities in other States, many governmental units of this class are highly urbanized and not easily distinguished from the urban incorporated places. Incorporated places, of which there are over 16,000, may be designated as cities, towns, villages, or boroughs. The larger ones are usually known as cities, while smaller units of this class are most commonly called towns, villages, or boroughs. Confusion results from indiscriminate use of the term "town"—meaning village in some States, and unincorporated subdivisions of a county in others.

Counties as organized units of government have diversified functions. While localized affairs are their primary concern, they also function as agents of the State government for the enforcement of laws enacted by the State and for administration of public services authorized by the State. The 19,000 townships and 16,000 incorporated places in the United States have a wide variety of governmental authority. In some, powers of county subdivisions are sweeping in character; in others, they are exceedingly limited. On the other hand, much of the authority with which many counties are vested is not exercised and a great number of the duties with which they are charged are not actually performed since, in practice, it proves more economical to operate on a county basis than to partition public functions further. Nevertheless, the usual county subdivisions continue to operate in a minor sense as separate governmental entities even though such operation may be expensive and ineffective.

Public Health and Preventive Services

Local health organization has been modeled closely after general local governmental organization and reflects many of the same characteristics. While obviously it is impossible to summate all variations in the performance of local governmental organizations and authorities, it might be said that the more effective local health organizations are to be found in cities and counties of considerable population and economic resources. Exceptions to this generalization may be taken in those areas where the State has compensated for local lacks through grants of supplemental aid. The degree of realism and success with which community responsibility for the health of its residents is met is determined by the number of trained full-time health workers the community can afford or is willing

to employ. Many of the smaller and poorer counties find it impossible to support an adequate health service even with generous assistance from State and other outside sources. Consequently, combination of jurisdictions and pooling of resources for maintenance of an effectively operating health department has become an increasingly popular feature of local health organization. More than half of the States now have enacted permissive legislation, which specifies that cities, towns, villages, boroughs, townships, or minor civil divisions of other types may consolidate to form county health units. Nearly as many States have statutory authorization for neighboring counties to join forces as a district in order to support a full-time health service, which no one of them could maintain independently. (See appendix B.) A contained city wishing to preserve its identity, yet recognizing the advantages of cooperation with the rest of the county in the operation of a single health unit, may enter into what is known as a city-county agreement, an arrangement which has been treated in detail by Mountin and Norman (56). By such consolidation it is possible for the jurisdiction established to support a health department consisting of a corps of health specialists (physicians, nurses, dentists, sanitation personnel, health educators, nutritionists, analysts, and other necessary technical and clerical personnel), who will perform all health functions for the component political subdivisions. Most States now have machinery which permits them to strengthen local health services through merging their resources. While the number of local health authorities which operate independently of each other is still excessive, a fair amount of consolidation is being accomplished. According to current estimate (57), more than 18,000 local governmental jurisdictions, apart from school districts, have delegated responsibility for some form of health service to groups.

Because of rather haphazard arrangements for health services through official health agencies in many places, other local governmental agencies interested in special phases of health work have often assumed responsibility for their individual interests. For instance, boards of education may be concerned with the school health problems, departments of public works with construction and maintenance of sanitation facilities, and welfare agencies with provision of medical and hospital care. Likewise, a varying number of voluntary agencies contribute to the total health resources of any given community.

A thoroughly accurate enumeration of personnel employed throughout the United States in providing local public health services is difficult to obtain. Various estimates have been made, but the most complete count appears to have been obtained by Emerson and Luginbuhl (57) in a recent study financed by the Commonwealth Fund. The results are shown here as table 3. This enumeration includes personnel under the

TABLE 3.—*Personnel employed for local health services*[1] *in 1942 (57)*

Class of personnel	Number of personnel of each class employed in 1942		
	Total	Full-time	Part-time
All classes	40,782	29,201	11,581
Health officers	5,519	1,202	4,317
Other medical administrators	1,065	1,065	
Clinicians, part-time	4,656		4,656
Public health nurses	14,274	13,742	532
Sanitary personnel:			
Professionally trained, including engineers and veterinarians	577	539	38
Sanitarians, not professionally trained, including inspectors of various types	4,927	4,677	250
Clerical and secretarial workers, including those with statistical training	5,279	4,830	449
Laboratory workers:			
Professional	321	290	31
Technical	720	615	105
Unskilled	309	293	16
Dentists	1,266	307	959
Dental hygienists	372	318	54
Health educators	44	44	
Others	1,453	1,279	174

[1] In addition to health personnel of official agencies under the direction of both full- and part-time health officers, this enumeration includes nurses, physicians, dentists, and dental hygienists employed by local school boards.

direction of both full- and part-time health officers; it also includes nurses, physicians, dentists, and dental hygienists employed by local school boards, where such duties are so delegated.

Progress in local health organization in any area is measured in terms of the extent to which it is covered by organized health services under the direction of a full-time health officer. In fact, full-time leadership is regarded as being so important that Federal financial grants for general health purposes are extended only to health jurisdictions so administered. Size and degree of specialization of the health department staff required depend, of course, upon size of the population unit to be served. The proportion of population of the entire United States served by different types of local health organization is shown in table 4, another tabulation appearing in the Emerson-Luginbuhl study. Here, the population served by full-time local health service includes residents of cities, single counties, and groups of counties (local health districts) employing a full-time professional health officer for administration of the operating unit. Persons receiving part-time local health service are those living in localities which employ a health officer serving on a part-time basis only. To compensate for the absence of local full-time health units, a number of State health agencies have organized districts of several

political subdivisions each for more effective administration of State health services to at least a part of the population not otherwise provided for. For a small proportion of the population the State health district system supplements part-time local service; for a larger percentage, the State provides practically the only health service available in areas so covered.

TABLE 4.—*Population of continental United States served by designated type of local health service (57)*

Type of service	Population served	
	Total	Percent
All types	131,669,300	100.0
Full-time local health service	[1]87,411,000	[1]66.4
Other than full-time local health service:		
Part-time local health service	20,011,000	15.2
State district service only	10,868,300	8.2
Both part-time local and State district health service	4,152,400	[1]3.2
No local health service reported	9,226,600	7.0

[1] If one assumes that the 3,037,700 persons served through the New York State health districts also belong in this category, this percentage would be 68.7 and the category of combined part-time local health service and State district service would be 0.9 percent.

Geographic differences in schemes of health organization are very interesting and are influenced markedly by the pattern for general local government. As shown in figure 9, the city, town, or municipality is the type of local health jurisdiction encountered most frequently in the northeastern area. Single-county health departments and multicounty health units previously described have flourished in the southeastern and south central portions of the country. Health organizations of the latter class are usually referred to as local health districts. Worthy of particular note is the portion of each geographic area for which local initiative has failed to make any provision for full-time health service. When all forms of local health organization are combined, the fraction of the population that remains uncovered by the protection of full-time health service is larger for the north central States (47 percent) than for any other group, while the northeastern section has only a slightly better record. Only in the southeastern region are more than four-fifths of the inhabitants served by a health department under the direction of a full-time health officer.

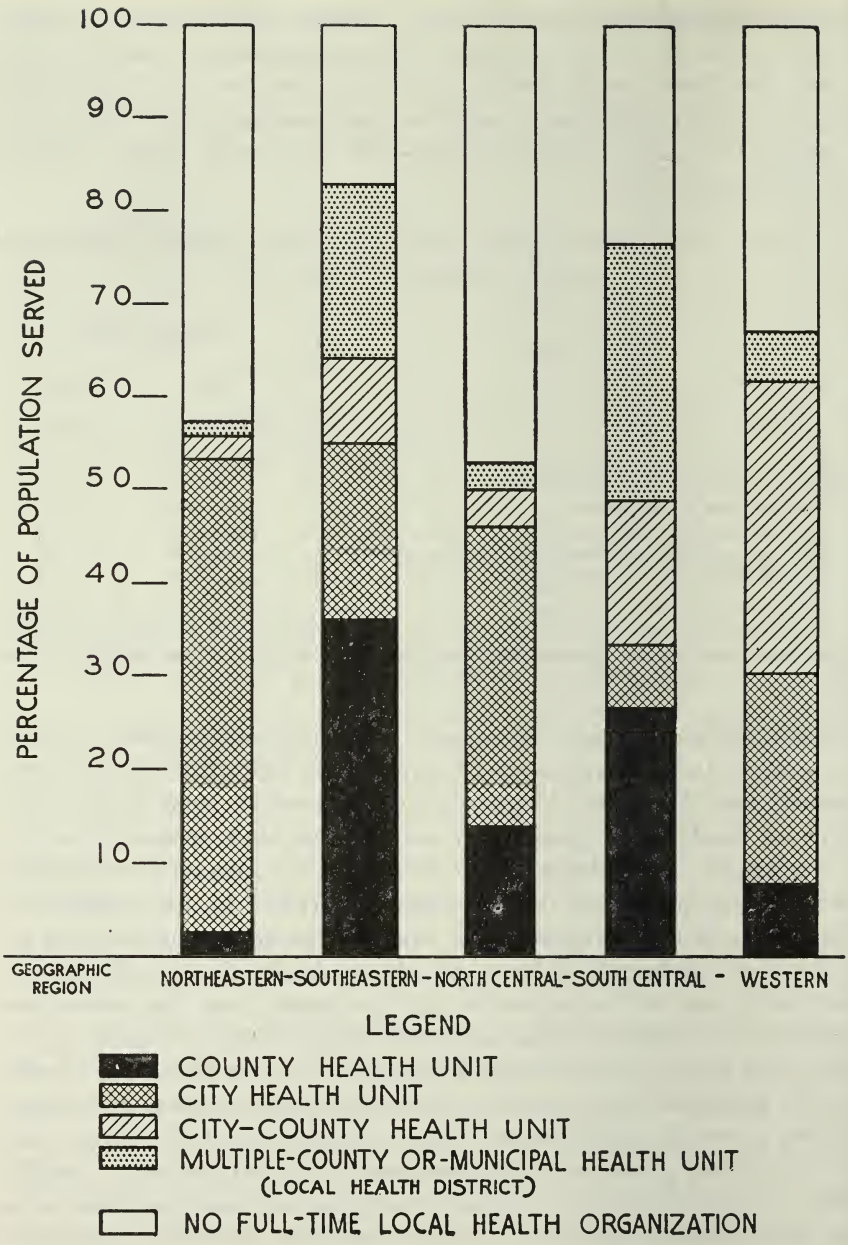


FIGURE 9—Proportion of the total population covered by full-time local health organization of specified type in each of five broad geographic regions.

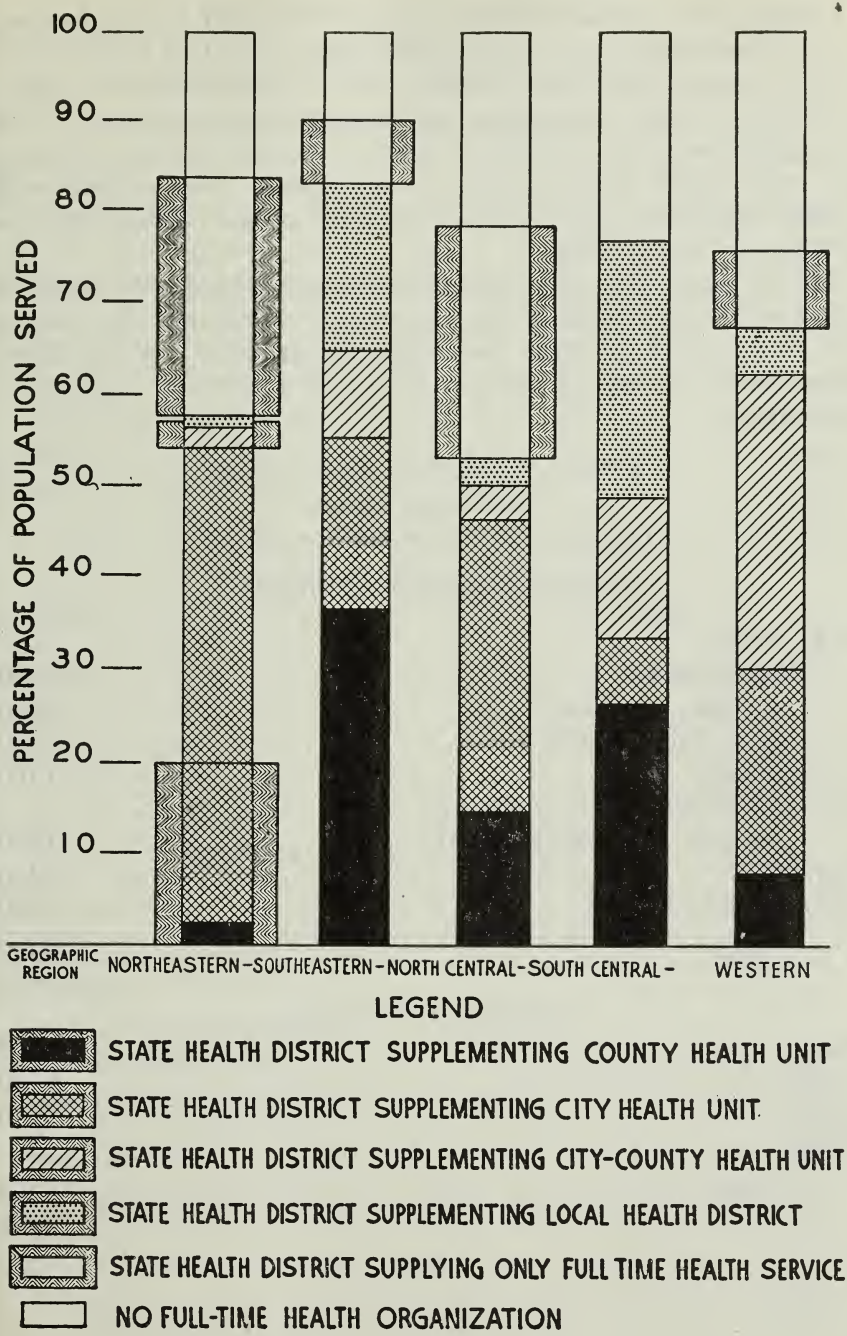


FIGURE 10—Supplementation of local full-time health organization by State health districts in each of five broad geographic regions.

Figure 10, a companion chart to figure 9, demonstrates the tendency to equalization that has come about in coverage of full-time health service by the device of State health districts. Even so, the southeastern section still leads all other areas from the standpoint of proportion of total population served by a full-time health organization. In a few instances, the State health district system is superimposed upon existing local health organization, but ordinarily it operates in lieu of, rather than in addition to, local activity.

At this point, there are presented several sample budgets of organized local health departments serving communities of different sizes during the fiscal year, 1946. These documents, perhaps better than any other, demonstrate the internal structure of a typical organized local health department.

TABLE 5.—*Budget for health services*

Small Rural County

Estimated Civilian Population—10,639

Item	*Amount*
DESCRIPTION OF PURPOSE	
SALARIES	
Health Officer	$ 4,300
Sanitation Supervisor	2,200
Senior Public Health Nurse	1,800
Secretary	1,100
OTHER PERSONAL SERVICES	
Clinicians' Fees (MCH & VD)	1,000
TRAVEL	2,100
OTHER EXPENSES	600
Total	13,100
SOURCE OF FUNDS	
State	1,100
Local	5,300
Federal	6,700
Other	—
Total	13,100

TABLE 6.—*Budget for health services*

Tri-County Unit

Estimated Civilian Population—78,937

DESCRIPTION OF PURPOSE

Item	*Amount*
SALARIES	
Health Officer	$ 4,800
Sanitation Engineers (4)	9,000
Public Health Nurses (6)	13,100
Junior Clerks (4)	4,400
OTHER PERSONAL SERVICES	
Wages	200
Clinicians' Fees (MCH & VD)	3,500
TRAVEL	6,600
OTHER EXPENSES	3,000
Total	44,600

SOURCE OF FUNDS

State	13,500
Local	16,800
Federal	14,300
Other	—
Total	44,600

TABLE 7.—*Budget for health services*

County Unit Containing Large City

Estimated Civilian Population—459,930

DESCRIPTION OF PURPOSE

Item	*Amount*
SALARIES	
Division of Administration	
County Health Officer	$ 6,000
Clerical and Fiscal Staff (5)	9,600
Custodial Workers (2)	1,500
Dentist	3,900
Pediatrician (PT)	2,100
Medical Comptroller	5,000
Division of Records & Vital Statistics	
Director	4,000
Clerical Staff (9)	14,400
Division of Laboratories	
Staff	26,500

TABLE 7.—*Budget for health services—Continued*

DESCRIPTION OF PURPOSE—Continued

Item	*Amount*
Division of Food and Dairy Inspection	
Director	3,600
Milk Sanitarians (6)	16,800
Clerical Staff (4)	6,800
Health Inspectors (8)	19,100
Veterinarians (2)	5,500
Division of Sanitation	
Director	3,900
Health Inspectors (8)	19,300
Clerical Staff (2)	2,900
Rodent Control Assistant	1,300
Division of Communicable Diseases	
Director (On loan from U. S. Public Health Service)	
Health Inspectors (3)	7,300
Senior Stenographers (2)	3,400
District Branch	
Health Inspectors (3)	7,600
Senior Bacteriologist	2,600
Typists (3)	4,300
Custodial Workers (2)	1,400
Division of Child Hygiene and Public Health Nursing	
Directors (2) (Rural & City)	7,900
Public Health Nurses (2)	32,300
Medical Social Workers (3)	5,200
Clerical Staff	15,200
Nursing Assistants (2)	2,000
Custodial Workers (3)	2,700
Division of Health Education	
Staff	11,400
Health Center A	
Public Health Nurses (7)	$ 11,800
Nursing Assistant	1,000
District 1	
Public Health Nurses (3)	5,100
Nursing Assistant	1,100
Custodial Worker	200

TABLE 7.—*Budget for health services—Continued*

DESCRIPTION OF PURPOSE—Continued

Item	*Amount*
Health Center B	
Senior Public Health Nurses (4)	7,500
Senior Clerk-Typist	1,400
Custodial Worker	900
District 2	
Public Health Nurses (4)	7,600
Nursing Assistant (PT)	300
Custodial Worker	200
Health Center C	
Medical Director (On loan from U. S. Public Health Service)	
Public Health Nurses (10)	16,100
Medical Social Workers (3)	5,200
Clerk-Typists (4)	5,000
Laboratory Technician	1,500
Nursing Assistants (4)	4,100
Custodial Workers (4)	3,500
District 3	
Public Health Nurses (3)	5,400
Clerk-Typists (PT) (2)	1,000
Health Center D	
Public Health Nurses (9)	13,100
Clerical Staff (3)	4,300
Nursing Assistant (2)	2,200
OTHER PERSONAL SERVICES	
Clinicians' Fees (MCH & VD)	21,400
Clinicians' Fees (Hospital)	2,400
TRAVEL	30,200
OTHER EXPENSES	32,300
Total	440,300

SOURCE OF FUNDS

State	3,900
Local	281,800
Federal	154,600
Other	—
Total	440,300

The picture of local health organization would not be complete without consideration of the program content of local health departments of various types. As aptly stated by Mustard (58), " * * * the vast majority of routine health service received by the people of the United States is delivered by local agencies. The Federal Government may subsidize and indirectly shape local health departments, the State health department may determine major policies for local agencies, set standards, promulgate regulations, and even directly supervise them, but the final determining factor in the effectiveness of a public health program rests with the workers in the locality where the problems are occurring."

Provision of public health nursing service is perhaps the most widespread function of local health agencies. Operation of different kinds of clinic facilities is another outstanding service. Data in the files of the Public Health Service from several selected States show that such clinics may be established for supervision of maternity patients and young children; performance of immunizations against smallpox, diphtheria, and other communicable diseases; diagnosis of tuberculosis; collapse therapy of nonsanatorium patients; mental hygiene; diagnosis and/or treatment of cancer; and, occasionally, general diagnosis and treatment. All types of clinics are not operated with equal frequency. Immunization, venereal disease, well-child, and diagnostic tuberculosis clinics are usually found among the local health department's roster of activities, while collapse therapy, mental hygiene, cancer, and polyclinics are noted much less extensively.

Other health services frequently available through local health departments are supervision and sanitary control of water supplies, sewage disposal facilities, milk production and distribution, and food-handling establishments; diagnostic laboratory services; school health services, including physical inspection or examination and health instruction; nutrition services; and general health education. Collection and analysis of vital statistics is also a function of some local health departments.

Some idea of the completeness of different kinds of local health services may be gained from the most recent Evaluation Schedules (59) prepared by 243 local health jurisdictions and submitted to the Committee on Administrative Practice of the American Public Health Association for grading and inclusion in the new edition of Health Practice Indices (60). While it is not claimed that the participating health departments are an entirely representative group, various types of health organization serving communities ranging in population from 8,000 to 1,957,500 and representing 32 different States are included. The following half dozen indices from the array developed by the Committee on Administrative Practice have been chosen for presentation in this article to reflect extent of local health services:

Percentage of cases of typhoid and paratyphoid fever investigated for which sources were found

Percentage of contacts to newly found cases of tuberculosis that were examined

Percentage of reported contacts to early and early-latent cases of syphilis that were examined

Percentage of children under 5 years of age who were vaccinated against smallpox

Percentage of children under 2 years of age who were immunized against diphtheria

Percentage of restaurants, lunch counters, and taverns having approved sanitation and food-handling facilities

Performance of the health jurisdiction occupying the median position with respect to each selected index of community health practice is shown herewith. First, the median has been determined for the entire group of reporting communities, and, secondly, the reporting jurisdictions have been classified according to 5 broad geographic regions, with the median performance computed for each area. Since all 243 jurisdictions did not answer every question in the schedule, the number supplying positive information on each of the items listed is recorded in table 8.

The marked variations which characterize local health practices are illustrated just as emphatically in this table as are differences in local health organization in figures 9 and 10. Each of the indices selected is a recommended, elementary procedure for protection of community health; yet, of the particular group for whom a designated service was intended, the proportion reached ranges from 17.0 percent to 72.3 percent in the median health jurisdiction of the entire reporting group. Even a wider difference occurs among jurisdictions of each separate geographic section of the country. Moreover, for a single criterion—such as restaurants, lunch counters, and taverns with approved sanitation and food-handling facilities, or reported contacts of early and early-latent cases of syphilis that were examined—there is extreme variability with respect to performance in the several geographic areas.

Medical and Custodial Care

Whereas State provisions for medical and hospital care are focused primarily upon mental disorders and secondarily upon tuberculosis, with relatively little attention to general illnesses, local governments have been much more active in the operation of general and allied special hospitals. Counties, cities, and counties and cities combined operate about 600 hospitals with a total capacity of more than 100,000 beds for care of patients with general illnesses (61). Three times as many tuberculosis hospitals are maintained by units of local government as by State govern-

TABLE 8.—*Completeness of designated health services in a selected group of health jurisdictions as reflected by reported performance in the median community of each geographic area and of all areas*[1]

Health Index	Number of reporting jurisdictions and percentage of specified group reached by each service in the median jurisdiction of each geographic area											
	All Areas		Northeastern		Southeastern		North Central		South Central		Western	
	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction
Cases of typhoid and paratyphoid fever investigated for which sources were found.	166	42.9	7	59.2	11	73.9	57	50.0	80	31.4	11	59.7
Contacts to newly found cases of tuberculosis that were examined.	188	71.1	9	75.9	8	76.3	78	75.4	83	63.0	10	79.6
Reported contacts to early and early-latent cases of syphilis that were examined.	159	70.0	7	100.0	10	63.0	49	83.3	84	64.3	9	55.6
Children under 5 years of age who were vaccinated against smallpox.	181	17.0	7	29.7	10	9.9	73	22.5	77	8.8	14	21.4
Children under 2 years of age who were immunized against diphtheria.	189	17.1	10	36.3	11	27.8	66	12.1	89	17.6	13	15.1
Restaurants, lunch counters, and taverns having approved sanitation and food-handling facilities.	180	72.3	7	97.8	9	99.3	64	51.8	90	69.2	10	75.8

[1] From basic material in files of the American Public Health Association.

ment; however, the combined bed capacity of city and county tuberculosis institutions exceeds that of State tuberculosis sanatoria by only about 15,000. There are few city or county mental hospitals; altogether, they have less than one-tenth the number of beds found in State institutions for mental patients. Tables comparing the hospital facilities sponsored by different types of agencies are presented in appendix C. Local governmental hospitals of all types are sometimes administered by health departments, but more often by departments of welfare, boards of county commissioners, or other boards named especially for that purpose.

Home and office care of the medically indigent is usually a feature of the broader public assistance programs of local welfare departments. Only occasionally is it a function of the local health department. In some instances a city or county physician is employed on a full-time basis for this service. Frequently, private physicians of the community serve the public assistance clients and others whose care is financed from tax sources at an adjusted fee rate.

VOLUNTARY HEALTH AGENCIES

Public Health and Preventive Services

Voluntary health agencies may supplement the local official health agency in maintenance of maternity, pediatric, mental hygiene, and cancer clinics. These agencies are more active in urban communities than in rural areas. They have reached a particularly high point of development in the New England portion of the United States where a relatively large proportion of all public health personnel are employed by voluntary health agencies, which also sponsor a great number of health facilities and services.

More than 20,000 separate agencies, pioneering groups of citizens whose work is supported largely from private sources, contribute to the total voluntary health effort. In addition to providing health services which supplement those from official sources, voluntary health agencies engage in health education activities and work for the advancement of research and the enactment of legislation for improvement of health. Voluntary agencies are more free to engage in experimental pursuits than are tax-supported organizations; consequently, exploration of new fields of health activity is one of their primary functions. Frequently, by practical demonstration of new and improved methods, the voluntary agencies pave the way for broader and more effective health programs by official agencies.

Gunn and Platt (62) have recently classified voluntary health agencies in three broad groups: Those concerned with certain specific diseases — notably tuberculosis, syphilis, gonorrhea, cancer, poliomyelitis, and diabetes; those interested in the safeguarding of specific organs or

functions — as the eyes, ears, teeth, skeleton, and heart; and thos promoting the health of special groups or of society — maternal an child hygiene, planned parenthood, mental hygiene, and hazards t life and limb. Most of the 20,000-odd voluntary health agencies operat at the city or county level, but nearly 300 have a State-wide field o activity. Organizations of 16 are national in scope. Exclusive of th American Red Cross, which embraces many interests besides health im provement, nearly $50,000,000 is expended annually throughout th country by the nationally sponsored voluntary agencies devoted to publi health work.

Medical and Custodial Care

Voluntary group prepayment plans for hospital service and medical service are a growing institution in the United States. Hospital service plans, organized on a nonprofit basis are further developed than medical service plans. Reed and Vaughan have collected an interesting body of data concerning medical and hospital plans. Some of their findings (63) (64) and reports of other related studies (65) (66) are particularly pertinent to this discussion of over-all provisions for health service in the United States, and are included here.

According to the most recent information available, there are in operation in the continental United States 80 hospital service plans with an enrollment of nearly 20,000,000 persons, as compared with 30 medical plans having a membership of 2,200,000. All but 5 States now have some sort of voluntary hospital service plan in operation. Furthermore, the entire area of 33 States is covered either by a single plan operating on a State-wide basis, by two competing State-wide plans (1 State), or by several local plans which together cover the whole State. For the most part there is enabling legislation for organization of hospital insurance plans. Such statutes usually exempt the plans from taxation, call for their supervision by the State insurance department, and apply to local as well as State systems. New plans for both medical and hospital service are being organized continuously, and enrollment under existing plans is increasing.

Benefits of the various hospital plans vary. Half of them provide semiprivate room accommodations; another large group offers a choice of semiprivate or ward beds; a few provide ward service only; and the remainder offer various combinations. Members are not restricted to the type of facilities covered by their prepayment contract if they pay the difference between the value of accommodations allowed and the regular rate charged for the room selected. Though there are variations, most plans offer 21 days of complete service, with a 50-percent discount for the next 90 days. All plans cover room and board, use of the operating and delivery rooms, general nursing service, and—in varying degrees

of completeness—laboratory service, drugs, dressings, casts, and splints. Some include anesthesia, X-ray, metabolism tests, electrocardiogram, physical therapy, and oxygen. Care for mental disorders and tuberculosis is usually excluded from coverage.

A subscriber to a hospital service plan may obtain membership for himself alone, for himself and his wife, or for his entire family. Typical subscription rates on a monthly basis are $0.75 for a single person, $1.50 for husband and wife, and $2.00 for a family.

Medical service plans are sponsored by State or local medical societies and usually cover physicians' fees for surgical and obstetrical service in hospitals. However, when the hospital plan does not cover X-ray, laboratory, and anesthesia, these services are usually included in the medical plan. Subscription rates for medical service contracts are about the same as for membership in a hospital service plan.

The relationship between medical and hospital service plans runs the gamut from no coordination whatever to one organization with a single board of directors offering both hospital and medical service. Between these extremes are two other characteristic relationships. Under the one there are two separate corporations with separate executive directors but joint control of certain administrative functions such as enrollment, billing, and record keeping. Under the other, there are separate corporations and separate boards of directors, but a single executive director with one administrative staff. Here the medical plan has no employees of its own. Only the policy making is the work of two separate bodies, for the medical plan is administered by the hospital service plan.

During the past decade, commercial insurance companies, particularly large life insurance companies and casualty companies, have greatly extended their coverage in the provision of indemnity insurance for hospital care and surgical and obstetrical service. Reimbursement of expenses for home and office care is a recent and largely experimental undertaking by insurance companies. Approximately 8,500,000 persons are carried by commercial insurance companies for hospital care, 5,500,000 for physicians' services to surgical and obstetrical patients, and 150,000 have policies covering home and office care. Such illness insurance is sold on both a group and individual basis.

Of longer standing are the industrial medical service plans. More than a quarter of a century ago a few railroad, mining, and manufacturing companies found it desirable to establish some form of medical service to compensate for the absence of such care under other auspices. Now, more than 100 industrial companies have some organized scheme for furnishing medical care to their employees, and, quite often, to their employees' dependents. Industrial medical service plans usually provide hospitalization and physician's care in the office, home, and hospital. Generally, such plans are financed largely by the employees through

periodic deductions from their pay, with some contribution from the employer. However, in a few instances, the entire cost of complete medical care to all employees and their dependents is borne by the company. It is estimated that about 2,000,000 people are served by such plans for hospitalization, with perhaps a slightly smaller number for other types of service.

Nongovernmental hospital facilities for general and allied special conditions dominate those maintained by either State or local governments, with respect both to count of institutions and to number of beds. There are two classes of nongovernmental hospitals, nonprofit and proprietary. Together, they number nearly 4,000 with a total bed capacity of more than 338,000. Table 1 of appendix C emphasizes the important place of nongovernmental agencies in the operation of all general and allied special hospitals. In size, nongovernmental hospitals run somewhat smaller than those operated by governmental bodies (table 2, appendix C), but the relatively large number of nongovernmental institutions among general hospitals places them in the foremost position among this group.

A recent survey of civilian hospitals (67) reveals that nongovernmental general and related hospitals exceed those of any governmental jurisdiction not only in total plant valuation but also in the average valuation per bed, average annual purchase of equipment and supplies per bed, average payroll per bed, and average number of personnel employed per 100 beds. In this study, assets and operating costs were not broken down by control for mental and tuberculosis hospitals. However, comparison of totals for civilian hospitals of all medical types with those for general and allied special conditions only shows that mental and tuberculosis hospitals are less expensive to operate than those of the "general" classification (table 6, appendix C.) Nongovernmental hospitals are financed primarily through fees collected from patients, though endowments and aid from tax sources account for nearly one-fourth of their income (68). There is marked variation in the geographic distribution of hospital facilities as demonstrated in tables 3, 4, and 5 of appendix C. Characteristics which favor hospital establishment are: a large total population; concentration of population in urban areas; high per capita spendable money income; and presence of a large city within the same county or close proximity to a large city in a neighboring county. Rural areas having a low economic status are poorly supplied with hospital facilities, particularly those of nongovernmental control.

Although the number of nongovernmental hospitals for nervous and mental disorders and for tuberculosis is fairly high, such institutions are apt to be small in size, and the total bed capacity is only a minor fraction of that supplied by governmental institutions of like medical types, as noted in tables 1 and 2 of appendix C.

PROFESSIONAL EDUCATION

While it cannot be considered a health service in a direct sense, professional education, both basic and postgraduate, determines the caliber of personnel employed for the performance of health service. Educational facilities, particularly medical, dental, and engineering schools, play an important part in providing the fundamental training for public health workers. Hospitals, too, though primarily service institutions, occupy a prominent educational position for nurses and physicians. Training in public health as a specialty is acquired as postgraduate study; however, the kind of instruction in preventive medicine and public health that physicians receive in medical school and the kind of fundamental training that nurses receive in their elementary courses form an important background. Although some of these schools and hospitals are tax-supported, more are privately maintained for most of the professions operating in the health field. This is especially true with respect to schools of nursing. Table 1 of appendix D carries a complete count of schools in the United States which offer accredited basic courses in the several health professions and shows the relative position of each level of government and of nongovernmental agencies with respect to their operation.

Except in the instance of nursing, accreditation of these schools is a responsibility of educational committees of the respective professional organizations. For instance, medical schools are approved by the Council on Medical Education and Hospitals of the American Medical Association; dental schools, by the Council on Dental Education of the American Dental Association; and engineering schools, by the Engineering Council for Professional Development. Nursing schools, on the other hand, are approved by the respective State Boards of Nurse Examiners, agencies established by State law. Upon graduation, members of each professional category are required to pass an examination before the State examining board covering their particular profession before being permitted to practice.

During the war period, the nurse education program of the United States Public Health Service was especially influential in providing training for nurses. This agency carried on an extensive recruitment program, financed both basic and postgraduate training, including intensive short courses and refresher courses, and provided consultant service to schools of nursing with respect to acceleration of regular curricula.

The curricula of universities offering postgraduate courses in public health usually include instruction in public health organization and administration, epidemiology, sanitation, health education, and public health statistics, as well as a number of elective subjects. From table 2 of appendix D may be obtained information regarding the number and control of schools offering graduate degrees in public health and in sani-

tary or public health engineering, as well as those offering certificates in public health nursing. Both State universities and those controlled by nongovernmental agencies are represented in the group giving advanced training in public health.

Within the past decade, State health departments stimulated by Federal grants-in-aid have fostered postgraduate training of public health workers with good basic education. Tuition at an approved school of public health for formal postgraduate academic training and a stipend to help cover living expenses during their period of study are paid eligible personnel. Operation of programs of in-service field training in selected health departments under a similar arrangement is quite common also.

More nurses have received postgraduate training through Federal grant-in-aid programs than any other professional group; however, physicians, particularly health officers, and sanitation personnel, including both engineers and sanitarians without an engineering degree, also have been given supplementary training in considerable numbers. Laboratory personnel, statisticians, health educators, venereal disease investigators, and nutritionists are others who have been trained in like fashion. Only rarely have dentists received additional training. To a large extent, the distribution of trainees reflects differences in the total number of public health personnel of various professional classifications.

SUMMARY

This whole discussion of health organization in the United States which involves the relationship and interrelationship of numerous agencies at the several levels of government and of voluntary health agencies and establishments may be summarized in terms of service to people. Several typical life experiences are cited as illustrations. At birth, both the child and mother are recipients of a number of public health services, even when the baby is born in a hospital with private physicians and nurse in attendance. The mother in all likelihood has had prenatal laboratory tests made by the State health department and may have attended the prenatal clinics of the local health department. During the first few moments of the infant's life, silver nitrate or some similar product supplied by the same State agency is dropped in his eyes as a precaution against blindness. The birth is reported to the local registrar, who in many instances is also the local health officer, and thence transmitted to the State health department where it is recorded and filed for safekeeping. When the mother goes home with her new baby, she may have a public health nurse from either the local health department or a voluntary visiting nurse association visit her to teach the proper care and feeding of the infant and of herself.

Of particular importance to the child's health is the sanitary quality of milk which is used in the home. In communities where only pasteurized milk is sold, this problem is relatively simple if close supervision over the pasteurization plants is maintained by the local health department. If raw milk is used, the public health nurse offers instruction in home pasteurization, while the local sanitarian attempts to increase its safety through sanitary inspections of farms and dairies and collection of milk samples for bacteriological tests to be made either locally or by the State health department. The degree to which tuberculosis and Bang's disease in dairy herds are controlled by the State department of agriculture is also significant in determining the safety of fluid milk.

After the child has reached the proper age, his parents may have him immunized against the more serious communicable diseases—diphtheria, smallpox, whooping cough—by personnel of the local health department who use materials supplied by the State. Moreover, he may receive periodic check-ups on growth and development at well-child conferences conducted by the local health department staff.

During his school life the child will likely receive several physical examinations by representatives of the local health department or, perhaps, of the local school board, with recommendations for any indicated corrective measures. Such corrections are to be performed by the family physician if possible. Provision of dental examination and correction will probably follow much the same pattern, although dental examinations are not yet made as routinely as general physical examinations. In relatively few communities are the discovered defects, either medical or dental, corrected directly by the health department or the school board. The child is usually referred to the family physician or dentist or to a public clinic. A number of voluntary agencies provide service for especially needy cases. Regulations of State and local boards of health isolating persons suffering from any communicable illness are other health protections which are afforded the school children of this country. Sanitary supervision of the school plant and premises is also maintained by local and, less directly, State health departments. Finally, classroom instruction in personal hygiene is another health service afforded school children.

At industries where the adults are employed, the health department makes recommendations to management and labor for prevention of occupational illnesses and accidents. It also provides routine blood tests and mass X-ray examination for the detection of venereal diseases and tuberculosis, in order that treatment might be instituted during the early stages of the disease. Persons found to have either may be treated in State or county facilities maintained especially for that condition. Venereal disease hospitals are usually under the jurisdiction of the State health department or the United States Public Health Service. Tubercu-

losis hospitals are administered either by the State or local health agency, by the State or local welfare department, or by a special board or commission operated on either a State-wide basis or locally.

Should the family decide to take a vacation trip, it can do so with greater ease of mind because of the protection of milk and water used on the train afforded through sanitary control by the United States Public Health Service. The food they eat in strange restaurants can be enjoyed with more confidence because of activities of State and local health departments and of the Federal Food and Drug Administration for improvement of its quality and sanitation in its handling.

Meanwhile, in the ordinary course of everyday living, the entire family is benefiting by organized health services for the community. For example, sanitary control maintained over the municipal water supply and sewage disposal facilities is perhaps the most important single contribution to physical well-being. Regulation of garbage collection and disposal is important not only as an aesthetic service, but also as a means of rodent and, indirectly, typhus control.

Medical care for general illnesses is usually obtained by a family directly from the physician of its choice. For the most part, the costs of such care must be met by the family as illness occurs; however, those who are members of prepayment medical insurance schemes are able to distribute the cost of illness over a prolonged period. The professional competence of attending physicians is assured by State systems of professional licensure.

For solution of most public health problems, the average citizen applies to his local health department which renders routine services. However, in carrying out its program, the local organization depends upon both State and Federal agencies for financial assistance and scientific findings regarding cause and treatment of disease. Moreover, if the resources of the local staff are overtaxed, State and Federal consultation service is available also. While all of the health services referred to in this pamphlet are not available to all communities, the advances made in public health organization, administration, and performance during the past 25 years may well be a source of pride to the American people. At the same time, with the wide field yet to be developed, accomplishments to date can be considered only as stepping stones to further progress.

BIBLIOGRAPHY

(1) a. United States Government Manual–Summer 1944. Division of Public Inquiries, Office of War Information. Washington.

b. United States Government Manual–Spring 1945. Division of Public Inquiries, Office of War Information. Washington.

c. United States Government Manual—1946 (First Edition). Division of Public Inquiries, Government Information Service, Bureau of the Budget, Washington.

(2) Federal Security Agency. Created by the President's Reorganization Plan I, dated April 25, 1939, in accordance with the provisions of the Reorganization Act of 1939 (53 Stat. 561; 5 U.S.C. 133). Expanded in 1940 by Plans II and IV under authority of the same Act. Further expanded by Reorganization Plan No. 2 of 1946, under authority of the Reorganization Act of 1945.

(3) United States Public Health Service. Established July 16, 1798 by Act of Congress. Original and all subsequent acts broadening the scope of activities are consolidated under the Public Health Service Act of July 1, 1944—Public Law 410 (58 Stat. 682) and amended by the National Mental Health Act of July 3, 1946—Public Law 487 and the Federal Hospital Survey and Construction Act of August 13, 1946—Public Law 725.

(4) Bolton Nurse Training Act—Public Law 74, 78th Congress—1st session.

(5) Permanent Census Act. March 6, 1902 (32 Stat. 52), April 27, 1904 (33 Stat. 362), June 18, 1929 (46 Stat. 26). Functions of the Vital Statistics Division transferred to the Federal Security Agency by Reorganization Plan No. 2 of 1946 and made a part of the Public Health Service.

(6) St. Elizabeths Hospital. Established March 3, 1855, by Act of Congress (10 Stat. 682; 24 U.S.C. 161-65). Renamed by Act of July 1, 1916 (39 Stat. 309; U.S.C. 165). Transferred to Federal Security Agency by President's Reorganization Plan IV, effective June 30, 1940. Functions changed by Reorganization Plan No. 3 of 1946.

(7) Freedmen's Hospital. Created in 1865. Incorporated by Act of March 3, 1871 (16 Stat. 506; 24 U.S.C. 261). Transferred from the Department of the Interior to the Federal Security Agency by section 11 (b) of Reorganization Plan IV, effective June 30, 1940.

(8) Federal Social Security Act of 1935. (49 Stat. 629, as amended by 53 Stat. 1380; 42 U.S.C. 701-31). Children's Bureau transferred to the Federal Security Agency by Reorganization Plan No. 2 of 1946.

(9) United States Office of Education. Established March 2, 1867 by Act of Congress (14 Stat. 434; 20 U.S.C.1). Under the President's Reorganization Plan I, effective July 1, 1939, the United States Office of Education with all its functions was transferred from the Department of the Interior to the Federal Security Agency.

(10) Office of Vocational Rehabilitation. Created within the Federal Security Agency to administer the Barden-La Follette Act of July 6, 1943 (57 Stat. 374), in a series of amendments to the Vocational Rehabilitation Act of June 2, 1920.

(11) Social Security Administration. Established as the Social Security Board under provisions of the Social Security Act (49 Stat. 620; 29 U.S.C. 45b, also title 42), approved August 14, 1935. Administered as a part of the Federal Security Agency under the direction and supervision of the Federal Security Administrator in accordance with the Reorganization Act of 1939 (53 Stat. 561; 5 U.S.C. 133 R), and Reorganization Plan I, made effective July 1, 1939. Under Reorganization Plan No. 2 of 1946, the Social Security Board was abolished and its activities taken over by the Social Security Administration.

(12) Food and Drug Administration. Established by Food and Drugs Act of 1906 (34 Stat. 3915; 21 U.S.C. 1 secs. 1-5) and Agriculture Appropriation Act of 1931 (46 Stat. 392). Transferred to Federal Security Agency by President's Reorganization Plan IV, effective June 30, 1940.

(13) Federal Food, Drugs, and Cosmetic Act—(21 U.S.C. 301-392).

(14) Tea Importation Act (21 U.S.C. 41-50).

(15) Import Milk Act (21 U.S.C. 141-149).
(16) Federal Caustic Poison Act (15 U.S.C. 401-411).
(17) Filled Milk Act (21 U.S.C. 61-64).
(18) Services originally provided by the United States Employees' Compensation Commission. Established September 7, 1916 by Act of Congress (39 Stat. 742; 5 U.S.C. 751). Amendments: March 4, 1927 (44 Stat. 1424; 15 U.S.C. 432), May 17, 1928 (45 Stat. 600; 33 U.S.C. 901 note), August 16, 1941 (55 Stat. 622; 42 U.S.C. 1651), December 2, 1942 (56 Stat. 1028; 42 U.S.C. 1651, 1701-1717), and April 3, 1939 (53 Stat. 561: U.S.C. 133-133B). Commission abolished by Reorganization Plan No. 2 of 1946, under authority of the Reorganization Act of 1945.
(19) Federal Trade Commission. Created by Federal Trade Commission Act of September 26, 1914 (38 Stat. 717; 15 U.S.C. 41-51). Amended March 21, 1938 (52 Stat. 111; 15 U.S.C. 41, 44-45, 52-58).
(20) Fair Labor Standards Act of 1938 (52 Stat. 1060; 29 U.S.C. 201-19).
(21) Bureau of Animal Industry, Department of Agriculture. Established May 29, 1924 by Act of Congress. (43 Stat. 243; 7 U.S.C. 401) and (144 Stat. 499).
(22) Meat Inspection Act of June 30, 1906 (34 Stat. 674) and of March 4, 1907 (34 Stat. 1260).
(23) Insecticide Act of April 26, 1910 (36 Stat. 335).
(24) Formerly office of Labor, Department of Agriculture. Established under authority of Executive Order 9334 of April 19, 1943 and Acts of Congress of April 29, 1943 (57 Stat. 70; 50 U.S.C. App. 4351), February 14, 1944 (58 Stat. 11), and Public Law 367, 78th Congress, 2nd session. Transferred to the Office of Production and Marketing Administration as the Labor Branch of that office by Secretary's Memorandum 1118, of August 18, 1945.
(25) Bureau of Dairy Industry, Department of Agriculture. Established May 29, 1924 by Act of Congress. (43 Stat. 243; 7 U.S.C. 401) and (44 Stat. 499).
(26) Bureau of Entomology and Plant Quarantine, Department of Agriculture. Established by Agriculture Appropriation Act of 1935 (46 Stat. 467).
(27) Bureau of Human Nutrition and Home Economics, Department of Agriculture. Established by Agriculture Appropriation Act of 1924 (43 Stat. 1289) and Research Administration Memorandum 5, pursuant to Executive Order 9069, and in conformity with Secretary's Memorandums 960 and 986.
(28) Extension Service, Department of Agriculture. Established by Agriculture Appropriation Act of 1924 (42 Stat. 1289) and Secretary's Memorandum 436. Transferred to War Food Administration by Executive Order 9322, dated March 26, 1943, as amended by Executive Order 9334 of April 19, 1943.
(29) Farm Security Administration, Department of Agriculture. Originally Resettlement Administration by authority of Emergency Relief Appropriation Act of April 8, 1935 (49 Stat. 115) and Executive Order 7027 of April 30, 1935. Transferred to Department of Agriculture and name changed to Farm Security Administration by Executive Order 7530 of December 31, 1936 and Secretary's Memorandum 732 of September 1, 1937. Consolidated within War Food Administration by Executive Orders 9280, 9322, and 9334.
(30) Federal Works Agency. Established April 25, 1939 by President's Reorganization Plan I, under provisions of the Reorganization Act of 1939.
(31) National Housing Act of 1934 and subsequent amendments (48 Stat. 1246; 12 U.S.C. 1702), as amended by Acts of Congress approved May 28, 1935; August 23, 1935; April 3, 1936; April 17, 1936; February 19, 1937; April

22, 1937; February 3, 1938; June 3, 1939; March 28, 1941; June 28, 1941; September 2, 1941; May 26, 1942; March 23, 1943; October 14, 1943; October 15, 1943; and June 30, 1944. The National Housing Agency represents a consolidation (effectuated under the First War Powers Act, 1941, on February 24, 1942, by Executive Order 9070) of the housing functions and activities of a number of separate agencies.

(32) Bureau of Mines, Department of the Interior. Established May 16, 1910 by Act of Congress (36 Stat. 369; 30 U.S.C. 1 note) and Executive Order 6611.

(33) Fish and Wildlife Service. Established June 30, 1940 in accordance with Reorganization Plan III, pursuant to the Reorganization Act of 1939, approved April 3, 1939.

(34) Office of Indian Affairs, Department of the Interior. Established March 3, 1849 by Act of Congress (9 Stat. 395; 5 U.S.C. 481).

(35) Tennessee Valley Authority. Established May 18, 1933 by Act of Congress (48 Stat. 58; 16 U.S.C. 831-831 dd) and Executive Order 6161.

(36) United States Maritime Commission. Established by the Merchant Marine Act of 1939 (49 Stat. 1985; 46 U.S.C. 1111), which followed: Shipping Act of 1916 (39 Stat. 728; 46 U.S.C. 801-42), Merchant Marine Act of 1920 (41 Stat. 988; 46 U.S.C. 13, 597-), Merchant Marine Act of 1928 (45 Stat. 689; 46 U.S.C. 891-91x), Intercoastal Shipping Act of 1933 (47 Stat. 1425; 46 U.S.C. 843-48) and amendments to those Acts (as modified by the 1936 Act). Also Executive Order 9054.

(37) War Shipping Administration. Established February 7, 1942 under authority of Executive Order 9054 and First War Powers Act (55 Stat. 838, ch. 593; U.S.C. title 50 App., secs. 601 et seq.).

(38) Surgeon General's Office, Army Service Forces, War Department. Established August 7, 1789 by Act of Congress.

(39) Bureau of Medicine and Surgery, U. S. Navy. Established April 30, 1798 by Act of Congress.

(40) Veterans Administration. Established July 21, 1930 under authority of Executive Order 5398.

(41) Office of Community War Services. Executive Order 9338, dated April 29, 1943 transferred to the Federal Security Agency from the Office for Emergency Management functions of the Office of Defense Health and Welfare Services (formerly Office of the Coordinator of Health, Welfare, and Related Defense Activities headed by the Administrator of the Federal Security Agency). Under Order 9338 and a Federal Security Agency order implementing it, the Office of Community War Services was established as an integral part of the Office of the Administrator, Federal Security Agency.

(42) War Relocation Authority, Department of the Interior. Established March 18, 1942 under authority of Executive Order 9102.

(43) Committee for Congested Production Areas. Established April 7, 1943 under authority of Executive Order 9327.

(44) Office of Civilian Defense. Established May 20, 1941 under authority of Executive Order 8757.

(45) Office of Scientific Research and Development. Established June 28, 1941 under authority of Executive Order 8807.

(46) Bureau of Selective Service, War Manpower Commission. Established September 16, 1940 by Act of Congress. Transferred to the War Manpower Commission by Executive Order 9279.

(47) War Food Administration. Established December 5, 1942 as Food Production Administration and Food Distribution Administration. March 26, 1943, designated as Administration of Food Production and Distribution. Designated as War Food Administration on April 19, 1943. Authority: Executive Orders 9280, 9322, and 9334.
(48) State Department. Established September 15, 1789 by Act of Congress.
(49) Office of Inter-American Affairs. Established July 30, 1941 under authority of Executive Order 8840.
(50) Pan American Sanitary Bureau. Created by the Second International Conference of American States in Mexico City, October 22, 1901—January 31, 1902. Formally organized by the First Pan American Sanitary Conference in Washington, December 2-4, 1902 and reorganized by the Sixth Pan American Sanitary Conference, Montevideo, December 12-20, 1920, and succeeding conferences.
(51) Anglo-American Caribbean Commission. Joint commission of the governments of the United States and Great Britain. Establishment announced simultaneously by the two countries March 9, 1942.
(52) Digest of Appropriations for the Support of the Government of the United States for the Fiscal Year Ending June 30, 1945 and on Account of Deficiencies for Prior Years—Made during the first and second sessions of the 78th Congress (July 17, 1943 to July 31, 1944 inclusive). Treasury Department, Fiscal Service, Bureau of Accounts, Division of Bookkeeping and Warrants. U. S. Government Printing Office, Washington, 1944.
(53) Mountin, Joseph W. and Flook, Evelyn: Distribution of Health Services in the Structure of State Government. Public Health Bulletin No. 184 (Third Edition). U. S. Government Printing Office, Washington, 1943.
(54) Housing Directory 1945—Publication No. N211. National Association of Housing Officials. Chicago.
(55) Anderson, William: The Units of Government in the United States. Publication No. 83. Public Administration Service. Chicago, 1942.
(56) Mountin, Joseph W. and Norman, Nina L.: Joint city-county health units. The Municipal Year Book. The International City Managers' Association. Chicago, 1945.
(57) Emerson, Haven and Luginbuhl, Martha: Local Health Units for the Nation. The Commonwealth Fund. New York, 1945
(58) Mustard, Harry S.: Government in Public Health. The Commonwealth Fund. New York, 1945.
(59) Evaluation Schedule of the American Public Health Association. Committee on Administrative Practice. American Public Health Association. New York, 1943.
(60) Health Practice Indices, 1943-44. Committee on Administrative Practice. American Public Health Association. New York, 1945.
(61) Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.
(62) Gunn, Selskar M., and Platt, Philip S.: Voluntary Health Agencies—An Interpretive Study. The Ronald Press Co., New York, 1945.
(63) Reed, Louis S., and Vaughan, Henry F. Jr.: The coordination of medical and Blue Cross plans. Journal of the American Medical Association, May 5, 1945. Vol. 128—pp. 22-25. American Medical Association. Chicago.
(64) Unpublished data in files of the United States Public Health Service.
(65) Special Study No. 74. Hospital Service Plan Commission of the American Hospital Association. Chicago.

(66) Klem, Margaret: Prepayment Medical Care Organizations (Bureau Memorandum No. 55, Third Edition, 1945, Bureau of Research and Statistics, Social Security Board). U. S. Government Printing Office, Washington, 1945.
(67) Survey of Civilian Hospitals. American Hospital Directory, 1945. American Hospital Association. Chicago.
(68) Pennell, Elliott H., Mountin, Joseph W., and Pearson, Kay: Business Census of Hospitals, 1935—General Report. Supplement No. 154 to the Public Health Reports. U. S. Government Printing Office, Washington, 1939.
(69) War Agencies of the United States and New York State, State of New York Executive Department. Division of Commerce. Albany, August, 1943.
(70) Masters, Ruth D.: Handbook of International Organizations in the Americas. Carnegie Endowment for International Peace, Division of International Law. Washington, 1945.

APPENDIX A

TABLE 1.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was expended by agencies of each specified type (53)*

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total** expended by each agency								
			Health department	Special boards or commissions	Department of welfare	Board of control	Independent State hospitals, laboratories, etc.	Department of labor	State university or college	Department of agriculture	All other agencies of State government
Total	$285,715,800	$1.90	18.5	25.0	21.3	16.0	5.4	3.2	3.2	2.3	5.1
Alabama	2,668,900	0.94	42.9	45.2	[1]	-----	-----	1.1	-----	2.9	7.9
Arizona	1,130,500	2.26	15.6	34.3	14.0	30.6	1.0	-----	-----	-----	4.5
Arkansas	2,721,000	1.40	23.6	23.9	8.7	33.4	-----	-----	8.5	-----	1.9
California	14,096,400	2.04	17.4	-----	0.2	49.9	-----	20.4	7.2	1.6	3.3
Colorado	2,752,600	2.45	16.8	0.5	13.1	-----	42.0	-----	23.1	0.3	4.2
Connecticut	6,007,200	3.51	9.3	31.1	1.5	-----	49.3	1.2	-----	-----	7.6
Delaware	1,076,100	4.04	41.7	[1]	[1]	-----	55.2	[1]	-----	-----	3.1
District of Columbia	6,608,800	10.44	40.2	1.4	-----	-----	-----	-----	-----	-----	58.4
Florida	3,109,900	1.64	17.7	22.0	[1]	53.1	-----	-----	-----	3.8	3.4
Georgia	2,964,200	0.95	38.7	[1]	55.4	-----	-----	0.8	-----	4.9	0.2
Idaho	986,000	1.88	25.7	[2]23.3	37.1	-----	-----	-----	-----	12.2	1.7
Illinois	17,678,000	2.24	8.7	0.2	[3]80.0	-----	-----	1.2	[4]	4.6	5.3
Indiana	7,332,800	2.14	9.1	1.6	76.4	-----	-----	[1]	10 [2]	-----	2.7
Iowa	4,780,300	1.88	10.0	[2]0.4	[2]0.4	47.9	-----	0.2	34.0	4.7	2.4
Kansas	3,008,400	1.67	13.5	9.7	72.2	-----	-----	0.8	[1]	1.0	2.8
Kentucky	2,522,500	0.89	40.1	8.6	47.3	-----	-----	[1]	-----	-----	4.0
Louisiana	5,754,200	2.43	17.9	3.5	[1]	-----	76.2	0.1	-----	-----	2.3
Maine	2,023,900	2.39	18.3	0.5	[2]9.5	61.7	-----	[1]	-----	7.8	2.2
Maryland	4,102,000	2.25	18.6	48.5	0.1	-----	0.7	0.8	15.9	0.5	14.9
Massachusetts	13,781,200	3.19	27.5	52.2	[2]12.8	-----	-----	1.4	-----	3.3	2.8
Michigan	12,439,100	2.37	10.5	80.4	[2]0.2	-----	-----	[5, 2]	6.2	1.5	1.2
Minnesota	6,148,500	2.20	11.3	2.4	66.9	-----	-----	0.7	15.5	1.4	1.8
Mississippi	2,143,900	0.98	42.4	[2]11.6	0.5	41.2	-----	-----	-----	[4]	4.3
Missouri	5,058,400	1.34	14.2	[1]	0.1	79.3	-----	0.6	2.7	0.8	2.3
Montana	1,472,700	2.63	11.4	25.9	11.7	46.9	-----	-----	-----	1.9	2.2
Nebraska	1,724,700	1.31	9.1	[1]	-----	82.3	-----	0.9	-----	7.7	-----
Nevada	469,200	4.26	21.9	51.3	-----	17.9	-----	-----	1.8	1.6	5.5
New Hampshire	1,637,400	3.33	12.7	8.9	9.5	-----	61.5	0.6	-----	5.1	1.7
New Jersey	10,875,900	2.61	8.3	3.4	6.7	76.8	-----	1.5	-----	1.3	2.0
New Mexico	690,000	1.30	32.2	[1]	[2]19.0	-----	40.8	-----	-----	-----	8.0
New York	44,054,800	3.27	15.9	78.6	[1]	-----	-----	2.1	-----	2.1	1.3
North Carolina	3,260,400	0.91	36.3	14.1	0.6	-----	45.1	0.1	-----	[2]1.6	2.2
North Dakota	2,090,900	3.26	8.4	13.3	16.4	56.5	2.8	-----	-----	1.0	1.6
Ohio	12,932,800	1.87	7.2	31.1	51.2	-----	-----	1.9	[2]3.6	1.7	3.3
Oklahoma	3,470,300	1.49	15.6	6.0	[6]	54.8	-----	0.4	20.4	[1]	2.8
Oregon	3,119,600	2.86	9.1	[2]33.8	[2]3.7	45.7	-----	1.1	[2]1.4	2.9	2.3
Pennsylvania	26,098,000	2.64	14.2	1.0	65.2	-----	-----	12.4	-----	4.9	2.3
Rhode Island	2,355,300	3.30	33.7	1.4	60.2	-----	-----	0.9	-----	2.1	1.7
South Carolina	3,523,800	1.85	25.1	[1]	-----	-----	71.9	0.9	1.2	[1]	0.9
South Dakota	1,359,400	2.11	15.1	2.6	13.4	62.9	-----	-----	1.9	2.0	2.1
Tennessee	2,228,500	0.76	50.8	-----	[1]	44.2	-----	[4]	[1]	[2]2.2	2.8
Texas	5,512,600	0.86	20.5	[1]	[1]	70.3	-----	[1]	-----	-----	9.2
Utah	1,401,400	2.55	31.8	28.1	0.9	-----	34.4	-----	-----	3.4	1.4
Vermont	889,700	2.48	20.4	16.4	57.3	-----	-----	-----	-----	3.8	2.1

See footnotes at end of table.

TABLE 1.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was expended by agencies of each specified type (53)*—Continued.

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total** expended by each agency								
			Health department	Special boards or commissions	Department of welfare	Board of control	Independent State hospitals, laboratories, etc.	Department of labor	State university or college	Department of agriculture	All other agencies of State government
Virginia	$4,392,700	$1.64	42.6	[2]52.5	2.7	-----	-----	0.5	[1]	1.4	0.3
Washington	3,818,900	2.20	7.5	[2]0.1	[2]2.6	-----	-----	[2]20.2	-----	4.3	65.3
West Virginia	3,781,600	1.99	10.4	17.8	21.9	39.1	-----	1.3	-----	1.7	7.8
Wisconsin	7,092,400	2.26	9.1	1.7	2.9	[7]60.2	-----	-----	17.0	5.5	3.6
Wyoming	569,500	2.27	19.2	22.7	-----	48.9	-----	0.9	-----	2.0	6.3
Alaska	182,900	2.51	93.6	-----	[1]	-----	-----	-----	-----	-----	6.4
Hawaii	2,129,900	5.03	52.4	-----	2.3	19.9	22.6	-----	-----	-----	2.8
Puerto Rico	3,534,200	1.89	99.2	0.8	-----	-----	-----	[1]	-----	-----	-----
Virgin Islands	151,500	6.09	96.4	-----	[1]	-----	-----	-----	-----	-----	3.6

* Expenditures for the health services considered represent index rather than absolute amounts and include all funds expended directly by State agencies and allotted by State agencies to their local counterparts. Such funds may have been derived from State appropriations, from Federal grants, from special fees, from voluntary donations or from local tax sources. They do not include local monies expended locally. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview which was held sometime during the year 1940. In some instances, estimates were accepted in the absence of precise expenditure records; in others, it was impossible to secure even an estimate.

** Percentage distribution is based upon the expenditure information reported for each agency even though that amount might be incomplete.

[1] Information not available.

[2] Information incomplete.

[3] Represents expenditures of two separate agencies of this classification.

[4] Units of the University of Illinois rendering service included here operate jointly with the department of welfare and are financed by that agency.

[5] Less than one-tenth of 1 percent.

[6] Financial grant-in-aid to the crippled children's commission for administration. Figure included in expenditure of that agency.

[7] The board of control no longer functions in Wisconsin. Operation of tuberculosis hospitals has been transferred to the State health department and operation of mental hospitals is now a function of the department of public welfare. However, records for a complete fiscal year were not available under the new administrative set-up.

TABLE 2.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was derived from each specified source (53)*

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total derived from each source					
			State	Local	U. S. P. H. S.—Title VI	U. S. P. H. S.—V. D. funds	U. S. C. B.—Title V	Other
Total	$285,715,800	$1.90	81.4	3.9	3.2	1.0	2.5	8.0
Alabama	2,668,900	0.94	66.6	--------	11.0	5.3	8.9	8.2
Arizona	1,130,500	2.26	53.8	--------	4.9	1.2	8.3	31.8
Arkansas	2,721,000	1.40	80.4	--------	8.2	3.7	5.5	2.2
California	14,096,400	2.04	62.7	7.9	2.2	1.2	1.8	24.2
Colorado	2,752,600	2.45	62.2	9.3	4.5	1.2	4.8	18.0
Connecticut	6,007,200	3.51	72.6	13.0	1.7	0.4	1.2	11.1
Delaware	1,076,100	4.04	83.1	--------	4.0	0.5	4.6	7.8
District of Columbia	6,608,800	10.44	97.3	--------	1.0	0.1	1.6	-------
Florida	3,109,900	1.64	73.7	3.4	4.4	1.0	4.4	13.1
Georgia	2,964,200	0.95	78.8	0.1	9.9	2.0	7.1	2.1
Idaho	986,000	1.88	49.3	2.1	7.4	1.4	7.0	32.8
Illinois	17,678,000	2.24	93.9	--------	2.4	0.6	1.9	1.2
Indiana	7,332,800	2.14	93.4	1.7	2.7	0.7	1.5	-------
Iowa	4,780,300	1.88	49.6	31.5	3.8	0.9	2.4	11.8
Kansas	3,008,400	1.67	74.3	4.7	4.5	1.8	4.2	10.5
Kentucky	2,522,500	0.89	75.3	--------	9.0	2.2	7.4	6.1
Louisiana	5,754,200	2.43	93.8	--------	3.0	0.6	1.7	0.9
Maine	2,023,900	2.39	85.0	1.0	3.2	0.4	4.5	5.9
Maryland	4,102,000	2.25	72.9	0.8	3.2	0.6	4.1	18.4
Massachusetts	13,781,200	3.19	95.7	--------	1.6	0.4	1.3	1.0
Michigan	12,439,100	2.37	87.3	6.1	2.2	0.9	1.4	2.1
Minnesota	6,148,500	2.20	73.5	11.4	3.2	0.5	2.4	9.0
Mississippi	2,143,900	0.98	75.8	--------	10.0	4.3	6.5	3.4
Missouri	5,058,400	1.34	88.7	0.7	5.4	1.5	2.1	1.6
Montana	1,472,700	2.63	53.2	6.3	3.9	0.2	5.6	30.8
Nebraska	1,724,700	1.31	72.2	9.7	3.3	0.5	4.4	9.9
Nevada	469,200	4.26	31.3	2.3	6.7	0.7	7.0	52.0
New Hampshire	1,637,400	3.33	84.5	0.9	3.1	0.7	3.4	7.4
New Jersey	10,875,900	2.61	67.2	23.1	1.9	0.6	1.8	5.4
New Mexico	690,000	1.30	64.0	--------	10.4	1.3	17.5	6.8
New York	44,054,800	3.27	97.6	--------	1.3	0.4	0.7	1
North Carolina	3,260,400	0.91	68.0	--------	9.6	1.6	7.3	13.5
North Dakota	2,090,900	3.26	30.7	47.2	2.9	0.1	4.8	14.3
Ohio	12,932,800	1.87	63.2	0.3	2.4	1.0	1.5	31.6
Oklahoma	3,470,300	1.49	82.7	2.7	5.4	2.6	3.3	3.3
Oregon	3,119,600	2.86	58.2	--------	2.9	1.0	4.1	33.8
Pennsylvania	26,098,000	2.64	85.9	--------	1.5	0.5	1.1	11.0
Rhode Island	2,355,300	3.30	93.2	--------	2.3	0.4	2.2	1.9
South Carolina	3,523,800	1.85	87.0	0.6	5.5	1.5	4.5	0.9
South Dakota	1,359,400	2.11	77.4	--------	5.4	0.5	5.0	11.7
Tennessee	2,228,500	0.76	63.4	4.6	13.6	3.0	7.6	7.8
Texas	5,512,600	0.86	80.6	--------	7.6	4.7	6.4	0.7
Utah	1,401,400	2.55	58.9	2.5	4.8	1.0	6.2	26.6
Vermont	889,700	2.48	85.8	0.7	4.8	0.1	6.1	2.5

See footnotes at end of table.

TABLE 2.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was derived from each specified source (53)*—Continued.

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total derived from each source					
			State	Local	U. S. P. H. S.—Title VI	U. S. P. H. S.—V. D. funds	U. S. C. B.—Title V	Other
Virginia	$4,392,700	$1.64	81.0	7.0	5.8	2.4	3.6	0.2
Washington	3,818,900	2.20	73.0	0.6	2.8	1.1	2.2	20.3
West Virginia	3,781,600	1.99	73.0	0.5	3.9	0.6	3.2	18.8
Wisconsin	7,092,400	2.26	71.9	17.0	2.3	0.3	1.9	6.6
Wyoming	569,500	2.27	67.5	[1]	4.8	0.3	7.0	20.4
Alaska	182,900	2.51	22.6	13.4	22.2	1.1	38.1	2.6
Hawaii	2,129,900	5.03	91.9	0.5	2.7	0.6	2.9	1.4
Puerto Rico	3,534,200	1.89	81.8	----	7.4	3.4	7.4	----
Virgin Islands	151,500	6.09	86.1	----	----	2.5	----	11.4

* Expenditures for the health services considered represent index rather than absolute amounts and include all funds expended directly by State agencies and allotted by State agencies to their local counterparts. Such funds may have been derived from State appropriations, from Federal grants, from special fees, from voluntary donations or from local tax sources. They do not include local monies expended locally. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview which was held sometime during the year 1940. In some instances, estimates were accepted in the absence of precise expenditure records; in others, it was impossible to secure even an estimate.

[1] Less than one-tenth of 1 percent.

APPENDIX B

Preliminary compilation of health laws pertaining to organization of full-time county health departments, county district health departments, and district health departments for two or more local political units other than counties (*SUBJECT TO REVISION*).[1]

State	*Summary of Provisions*
ALABAMA ..... Code 1940 Title 22	Authorization to establish full-time county health departments (sec. 5). Authorization to establish full-time county district health departments (sec. 8 (6)).
ARIZONA	No health unit laws found.
ARKANSAS ..... Digest of Statutes (Pope, 1917)	Provision of State aid for county health work (sec. 6444, 6445).
CALIFORNIA ..... Health and Safety Code	Provision for full-time county health officer (Division 1, pt. 2, ch. 1, art. 1,-455) County health administration for cities (ch. 1, art. 2, 476-486). Local full-time county health districts (ch. 6) Definition art. 1, 880-884, Formation art. 2, 900-922, Administration Operation art. 5, 940-944.
COLORADO	No health unit laws found.
CONNECTICUT ..... 1935 Cumulative Supplement to 1930 General Statutes.	Provision for sanitary districts of towns, cities and boroughs (sec. 929C).
DELAWARE	No health unit laws found.
FLORIDA ..... Statutes, 1941	Provision for full-time county health units (154.01). Provision for full-time county district health units (154.05).
GEORGIA ..... Code	Provision for sanitary districts of one or of two or more counties under full-time commissioners (sec. 88-301-312).
IDAHO	No health unit laws found.
ILLINOIS ..... Laws 1943 Act July 9, 1943	Provision for full-time county or county district health department (sec. 1).
INDIANA ..... Statute Annotated (Burns, 1933)	Provision for full-time county or city health officers (sec. 35-122). Provision for full-time county district health departments (sec. 35-125).

[1] Material compiled by William Fowler, Bureau of State Services, U. S. Public Health Service.

State	Summary of Provisions
IOWA ..... Code 1939	Provision for county health unit plan (not designated full-time) (2246.1-2246.4).
KANSAS ..... Laws 1943, C223	Provision for joint board of health for 2 or more cities, counties or city and counties (not designated full-time) (sec. 1).
KENTUCKY ..... Revised Statutes (Baldwin, 1942)	Provision for full-time county health departments, and full-time county district health departments (212.040 to 212.120). Provision for city and county board of health in county with city of first class (212.350).
LOUISIANA ..... General Statutes (Dart)	Provision for full-time parish health units (3366, 3379). Provision for full-time parish district health units (3367-3379). Parishes and municipalities acting jointly (6283.4).
MAINE ..... Public Acts (1933) Chapter 1	Provision of full-time local health officers for district of several towns, cities or organized plantations. (sec. 91).
MARYLAND ..... Code Annotated (Flack, 1939)	Provision for full-time county health officer (art. 43, sec. 51).
MASSACHUSETTS ..... Annotated Laws	Provision for health officers for unions of 2 or more towns (not designated full-time) (ch. 111, sec. 27A).
MICHIGAN ..... Statutes Annotated	Provision for county health departments (not designated full-time) (14.161). Provision for county district health departments (not designated full-time) (14.167).
MINNESOTA	No health unit laws found.
MISSISSIPPI ..... Code 1930	Provisions for full-time county and county district health departments (sec. 4926).
MISSOURI ..... Revised Statutes, 1939	Provision for deputy State commissioners of health in counties (not designated as full-time) (9745).
MONTANA	No health unit laws found.
NEBRASKA ..... Accumulative Supplement 1929 to 1941 Compiled Statutes Laws, 1943 (C. 152)	Provisions that counties of more than 200,000 may set up health districts with full-time directors (71.3601-71.3612). Provision for full-time county and county district health departments (sec. 1, 2).
NEVADA ..... Supplement (1931-1941) to Compiled Laws (1929)	Provision for county district health departments (not designated full-time) (sec. 5268.01). Provision for cities to join county or district health department (sec. 5268.02).

APPENDIX B—Continued

State	*Summary of Provisions*
NEW HAMPSHIRE..... Revised Laws (1942) Chapter 148	Provision for health officers for several towns (not designated full-time) (sec. 6).
NEW JERSEY..... Statutes Annotated	Provision for joint full-time health officers for 2 or more adjacent municipalities (26:3-22; 26:3-84; 26:3-88).
NEW MEXICO..... Statutes Annotated (1941)	Mandatory establishment of 10 health districts each employing district health officer (71-201, 71-202 and 71-203).
NEW YORK..... Consolidated Laws (McKinney) Public Health Law	Provision for single health officers serving 2 or more towns or villages (not designated full-time) (sec. 20, par. 2, 3). Provision for county health districts serving all or part of a county under direction of full-time county health commissioners (sec. 20-6, par. 2, 7).
NORTH CAROLINA..... Code 1939	Provision for full-time county health officers (7068). Provision for special tax, sanitary districts employing health officer (not designated full-time) (7078). Provision for full-time local and district health departments for any town, city and county or group of such units (7085) (1).
NORTH DAKOTA..... Laws 1943 Chapter 220	Provision for full-time county and county district health units (sec. 2).
OHIO ..... Code Annotated (Throckmorton, 1940)	Provision for health districts for cities as city health districts and for townships and villages of each county as general health districts and for unions of districts (not designated full-time) (sec. 1261-16; sec. 1261-20; sec. 1261-21).
OKLAHOMA ..... Statutes (1941) Title 63	Provision for funds for county departments of health (not designated full-time) (sec. 510). Provision for health districts of 2 or more counties under district superintendent of health (not designated full-time) (sec. 514). Provision for cooperative health departments for counties and cities (sec. 516).
OREGON ..... Compiled Laws Annotated	Provision for full-time county health department (sec. 99-204; 99-207).
PENNSYLVANIA	No health unit laws found.
RHODE ISLAND..... General Laws (1938) C. 329	Provision for 2 or more towns to combine to employ health officers (sec. 14).

APPENDIX B—Continued

State	*Summary of Provisions*
SOUTH CAROLINA Acts 1943 Number 211	Provision of funds for aid to county and district health work through county or district health departments (not designated full-time) (sec. 1).
SOUTH DAKOTA	No health unit laws found.
TENNESSEE Annotated Code (Williams) Title 13.C1	Provision for full-time county health departments (art. IV, 5783). Provision for city cooperation (art. IV, 5784). Provision for full-time county district health departments (art. IVA, 5788.1).
TEXAS Statutes Annotated (Vernon) Civil Statutes A. 4436a	Provision for city-county health units in counties with cities of 90,000-120,000 population (not designated full-time) (1, sec. 1). Provision for health units in counties under 22,000 (not designated full-time) (3, sec. 1).
UTAH	No health unit laws found.
VERMONT	No health unit laws found.
VIRGINIA	No health unit laws found.
WASHINGTON	No health unit laws found.
WEST VIRGINIA	Provision for full-time county and municipal health officers (sec. 1279). Provision for county district health officers (sec. 1280).
WISCONSIN Statutes, 1941	Provision for full-time county health departments (140.09). Provision for joint full-time health officers for contiguous towns, villages, and cities (141.04).
WYOMING	No health unit laws found.

APPENDIX C

TABLE 1.—*Total hospital facilities (exclusive of Army and Navy) in the United States according to medical type and type of control, 1943*[1]

Medical type and type of control	Hospitals		Beds	
	Number	Percent of total	Number	Percent of total
All medical types:				
All controls	6,057	100.0	1,260,973	100.0
Federal	234	3.9	88,285	7.0
State	534	8.8	610,207	48.4
Local governmental	918	15.1	189,044	15.0
Nongovernmental	4,371	72.2	373,437	29.6
General and allied special:				
All controls	4,798	100.0	507,607	100.0
Federal	160	3.3	37,840	7.4
State	75	1.6	23,196	4.6
Local governmental	596	12.4	108,070	21.3
Nongovernmental	3,967	82.7	338,501	66.7
Nervous and mental:				
All controls	579	100.0	650,490	100.0
Federal	32	5.5	44,231	6.8
State	269	46.5	554,333	85.2
Local governmental	55	9.5	32,028	4.9
Nongovernmental	223	38.5	19,898	3.1
Tuberculosis:				
All controls	459	100.0	81,131	100.0
Federal	18	3.9	4,631	5.7
State	75	16.3	24,767	30.5
Local governmental	229	49.9	39,438	48.6
Nongovernmental	137	29.9	12,295	15.2
Institutional:				
All controls	221	100.0	21,745	100.0
Federal	24	10.9	1,583	7.3
State	115	52.0	7,911	36.4
Local governmental	38	17.2	9,508	43.7
Nongovernmental	44	19.9	2,743	12.6

[1] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 2.—*Distribution by size of hospital facilities (exclusive of Army and Navy) of each medical type and each type of control, 1943*[1]

Medical type and size of hospitals	Control of hospital									
	All controls		Federal		State		Local governmental		Nongovernmental	
	Number of hospitals	Number of beds	Number of hospitals	Number of beds	Number of hospitals	Number of beds	Number of hospitals	Number of beds	Number of hospitals	Number of beds
All medical types:										
All sizes	6,057	1,260,973	234	88,285	534	610,207	918	189,044	4,371	373,437
Under 50 beds	2,530	67,333	81	2,562	72	2,268	295	8,990	2,082	53,513
50–99 beds	1,354	91,473	21	1,373	58	4,220	240	16,243	1,035	69,637
100–249 beds	1,272	193,359	29	4,909	78	12,325	192	29,561	973	146,564
250 beds and over.	901	908,808	103	79,441	326	591,394	191	134,250	281	103,723
General and allied special:										
All sizes	4,798	507,607	160	37,840	75	23,196	596	108,070	3,967	338,501
Under 50 beds	2,210	57,604	62	1,933	4	156	245	7,291	1,899	48,224
50–99 beds	1,100	74,264	14	946	15	1,136	156	10,399	915	61,783
100–249 beds	1,040	157,727	22	3,864	32	4,893	90	13,711	896	135,259
250 beds and over.	448	218,012	62	31,097	24	17,011	105	76,669	257	93,235
Nervous and mental:										
All sizes	579	650,490	32	44,231	269	554,333	55	32,028	223	19,898
Under 50 beds	107	3,140	-----	-------	1	28	1	32	105	3,080
50–99 beds	75	4,993	-----	-------	6	452	-----	--------	69	4,541
100–249 beds	60	9,909	-----	-------	4	496	20	3,914	36	5,499
250 beds and over.	337	632,448	32	44,231	258	553,357	34	28,082	13	6,778
Tuberculosis:										
All sizes	459	81,131	18	4,631	75	24,767	229	39,438	137	12,295
Under 50 beds	98	3,153	2	83	4	163	41	1,411	51	1,496
50–99 beds	126	8,703	3	154	7	563	76	5,328	40	2,658
100–249 beds	131	19,574	5	747	23	3,933	67	9,759	36	5,135
250 beds and over.	104	49,701	8	3,647	41	20,108	45	22,940	10	3,006
Institutional:										
All sizes	221	21,745	24	1,583	115	7,911	38	9,508	44	2,743
Under 50 beds	115	3,436	17	546	63	1,921	8	256	27	713
50–99 beds	53	3,513	4	273	30	2,069	8	516	11	655
100–249 beds	41	6,149	2	298	19	3,003	15	2,177	5	671
250 beds and over.	12	8,647	1	466	3	918	7	6,559	1	704

[1] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 3.—*General and allied special hospital facilities (exclusive of Army and Navy) in each State, 1943, and beds per 1,000 population*

State	Estimated civilian population[1]	Number of hospitals[2]	Number of beds[2]	Beds per 1,000 population
Total, all States	127,307,884	4,798	507,607	4.0
Alabama	2,718,273	76	6,249	2.3
Arizona	569,357	43	3,308	5.8
Arkansas	1,735,564	58	3,757	2.2
California	7,881,694	267	33,870	4.3
Colorado	1,067,095	67	5,430	5.1
Connecticut	1,748,402	50	8,161	4.7
Delaware	273,614	10	1,182	4.3
District of Columbia	816,982	20	5,493	6.7
Florida	2,012,046	81	6,718	3.3
Georgia	2,976,645	102	6,878	2.3
Idaho	473,166	40	1,908	4.0
Illinois	7,563,770	240	34,067	4.5
Indiana	3,383,312	108	10,337	3.1
Iowa	2,276,876	113	7,630	3.4
Kansas	1,678,722	97	6,763	4.0
Kentucky	2,549,108	76	5,575	2.2
Louisiana	2,316,681	62	8,790	3.8
Maine	782,312	56	3,401	4.3
Maryland	1,982,947	50	8,331	4.2
Massachusetts	4,093,072	162	24,521	6.0
Michigan	5,377,329	194	23,814	4.4
Minnesota	2,525,558	177	13,012	5.2
Mississippi	1,996,333	83	3,816	1.9
Missouri	3,524,790	111	14,977	4.2
Montana	470,033	56	3,375	7.2
Nebraska	1,176,023	88	4,909	4.2
Nevada	130,637	14	757	5.8
New Hampshire	453,333	33	2,256	5.0
New Jersey	4,080,485	106	16,154	4.0
New Mexico	490,119	42	2,501	5.1
New York	12,442,784	389	69,803	5.6
North Carolina	3,346,987	130	9,047	2.7
North Dakota	536,510	44	2,749	5.1
Ohio	6,828,352	170	22,984	3.4
Oklahoma	1,987,941	102	5,887	3.0
Oregon	1,172,674	64	5,236	4.5
Pennsylvania	9,273,242	272	40,117	4.3
Rhode Island	694,616	13	2,868	4.1
South Carolina	1,789,662	53	5,049	2.8
South Dakota	544,866	46	2,438	4.5
Tennessee	2,818,226	87	6,917	2.5
Texas	6,259,584	299	16,342	2.6
Utah	583,572	29	1,970	3.4
Vermont	316,074	21	1,492	4.7
Virginia	2,769,828	84	8,325	3.0
Washington	1,905,239	82	8,211	4.3
West Virginia	1,732,355	64	6,070	3.5
Wisconsin	2,945,355	145	13,183	4.5
Wyoming	235,739	22	979	4.2

[1] Estimated Civilian Population of the United States, by Counties: November 1, 1943. Series P-44, No. 3. Bureau of the Census. U. S. Department of Commerce. Washington. February 15, 1944.

[2] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 4.—*Nervous and mental hospital facilities (exclusive of Army and Navy) in each State, 1943, and beds per 1,000 population*

State	Estimated civilian population[1]	Number of hospitals[2]	Number of beds[2]	Beds per 1,000 population
Total, all States	127,307,884	579	650,490	5.1
Alabama	2,718,273	5	8,070	3.0
Arizona	569,357	2	1,008	1.8
Arkansas	1,735,564	2	5,827	3.4
California	7,881,694	36	35,765	4.5
Colorado	1,067,095	9	6,761	6.3
Connecticut	1,748,402	16	11,700	6.7
Delaware	273,614	2	1,753	6.4
District of Columbia	816,982	2	7,689	9.4
Florida	2,012,046	5	6,052	3.0
Georgia	2,976,645	5	9,832	3.3
Idaho	473,166	3	1,734	3.7
Illinois	7,563,770	32	48,101	6.4
Indiana	3,383,312	14	15,308	4.5
Iowa	2,276,876	12	12,472	5.5
Kansas	1,678,722	8	7,452	4.4
Kentucky	2,549,108	10	8,537	3.3
Louisiana	2,316,681	6	8,181	3.5
Maine	782,312	5	3,738	4.8
Maryland	1,982,947	16	11,057	5.6
Massachusetts	4,093,072	32	32,498	7.9
Michigan	5,377,329	20	28,147	5.2
Minnesota	2,525,558	12	15,836	6.3
Mississippi	1,996,333	5	5,647	2.8
Missouri	3,524,790	16	16,046	4.6
Montana	470,033	1	1,920	4.1
Nebraska	1,176,023	4	5,832	5.0
Nevada	130,637	1	350	2.7
New Hampshire	453,333	2	3,090	6.8
New Jersey	4,080,485	24	26,105	6.4
New Mexico	490,119	2	1,080	2.2
New York	12,442,784	59	105,241	9.2
North Carolina	3,346,987	10	9,082	2.7
North Dakota	536,510	2	3,163	5.9
Ohio	6,828,352	24	30,469	4.5
Oklahoma	1,987,941	9	9,346	4.7
Oregon	1,172,674	5	6,180	5.3
Pennsylvania	9,273,242	42	48,341	5.2
Rhode Island	694,616	4	4,089	5.9
South Carolina	1,789,662	3	5,572	3.1
South Dakota	544,866	2	2,620	4.8
Tennessee	2,818,226	10	9,126	3.2
Texas	6,259,584	17	19,557	3.1
Utah	583,572	2	2,065	3.5
Vermont	316,074	4	2,305	7.3
Virginia	2,769,828	11	12,643	4.6
Washington	1,905,239	8	9,581	5.0
West Virginia	1,732,355	6	4,581	2.6
Wisconsin	2,945,355	49	17,118	5.8
Wyoming	235,739	3	1,823	7.7

[1] Estimated Civilian Population of the United States, by Counties: November 1, 1943. Series P-44, No. 3. Bureau of the Census. U. S. Department of Commerce. Washington. February 15, 1944.

[2] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 5.—*Tuberculosis hospital facilities (exclusive of Army and Navy) in each State, 1943, and beds per death from tuberculosis, 1944*

State	Tuberculosis deaths (all forms)[1]	Number of hospitals[2]	Number of beds[2]	Beds per death from tuberculosis
Total, all States	54,731	459	81,131	1.5
Alabama	1,269	8	508	0.4
Arizona	784	13	989	1.3
Arkansas	826	2	1,351	1.6
California	3,826	32	4,995	1.3
Colorado	419	13	1,280	3.1
Connecticut	661	6	1,788	2.7
Delaware	123	3	214	1.7
District of Columbia	547	1	686	1.3
Florida	823	4	530	0.6
Georgia	1,141	3	882	0.8
Idaho	109	1	50	0.5
Illinois	3,218	32	4,309	1.3
Indiana	1,221	11	1,704	1.4
Iowa	341	5	788	2.3
Kansas	357	2	482	1.4
Kentucky	1,726	5	1,128	0.7
Louisiana	1,158	5	456	0.4
Maine	279	4	473	1.7
Maryland	1,326	6	1,547	1.2
Massachusetts	1,698	23	4,038	2.4
Michigan	1,814	26	5,090	2.8
Minnesota	693	15	2,113	3.0
Mississippi	831	1	425	0.5
Missouri	1,487	5	1,938	1.3
Montana	175	1	260	1.5
Nebraska	211	1	200	0.9
Nevada	76			
New Hampshire	105	2	240	2.3
New Jersey	1,856	16	4,244	2.3
New Mexico	345	5	569	1.6
New York	6,055	56	12,354	2.0
North Carolina	1,239	20	2,818	2.3
North Dakota	86	1	363	4.2
Ohio	2,787	22	3,317	1.2
Oklahoma	880	5	807	0.9
Oregon	307	4	589	1.9
Pennsylvania	4,020	16	4,964	1.2
Rhode Island	300	4	997	3.3
South Carolina	660	5	866	1.3
South Dakota	178	2	322	1.8
Tennessee	1,881	7	1,216	0.6
Texas	3,126	15	2,134	0.7
Utah	73	1	100	1.4
Vermont	124	3	175	1.4
Virginia	1,344	7	1,575	1.2
Washington	702	12	1,575	2.2
West Virginia	764	6	1,356	1.8
Wisconsin	726	21	2,293	3.2
Wyoming	34	1	33	1.0

[1] Tuberculosis Mortality in Each State, 1944. Public Health Reports 61:129 (February 1, 1946).

[2] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

APPENDIX C—Continued

TABLE 6.—*Total civilian hospital facilities in the United States, 1944, and projected estimates of their assets, together with corresponding information for general civilian hospital facilities of the same year, by type of control*[1]

Facilities, 1944	All civilian hospitals	General civilian hospitals of designated control				
		All controls	Federal	State	Local governmental	Nongovernmental
Total hospital facilities:						
Number of hospitals	6,085	4,383	153	95	566	3,569
Total bed capacity	1,284,867	498,987	43,108	27,592	111,263	317,024
Total bassinet capacity	78,945	74,034	733	1,600	9,967	61,734
Projected estimates for total above facilities:						
Plant valuation	$3,819,299,932	$2,318,214,449	$149,024,356	$103,994,248	$439,155,061	$1,626,040,784
Average valuation per bed	$2,972	$4,646	$3,457	$3,769	$3,947	$5,098
Year's purchase of supplies	$493,858,706	$344,889,730	$13,794,560	$12,885,464	$46,507,934	$271,701,772
Average purchase per bed	$384	$691	$320	$467	$418	$857
Year's purchase of equipment	$39,426,933	$29,790,648	$1,349,280	$962,961	$4,717,551	$22,760,856
Average purchase per bed	$31	$60	$31	$35	$42	$71
Year's pay roll	$698,859,463	$499,077,449	$44,271,916	$22,404,704	$90,679,345	$341,721,484
Average pay roll per bed	$544	$1,000	$1,027	$812	$815	$1,078
Full-time personnel	685,983	530,500	27,589	23,729	84,560	394,622
Average personnel per 100 beds	53	106	64	86	76	124

[1] Information summarized from tables presented in Survey of Civilian Hospitals. American Hospital Directory 1945. American Hospital Association. Chicago.

APPENDIX D

TABLE 1.—*Schools in the continental United States offering accredited basic courses in medicine, dentistry, sanitary engineering or civil engineering with a sanitary option, and nursing, and number of graduates in 1941*

Type of basic course	Number of schools of designated control offering each type of basic training					Graduates in 1941
	All controls	Federal	State	Local governmental	Nongovernmental	
Medicine	[1]69	1	27	3	38	[1]5,275
Dentistry	[2]39	1	12	2	24	[2]1,568
Sanitary engineering or civil engineering with sanitary option	[4]27	..	18	..	9	[5]
Nursing	[6]1,297	2	80	119	1,096	[7]24,899

[1] Totals — Journal of the American Medical Association. 129: 1 (September 1, 1945) American Medical Association. Chicago.

Control — Educational Directory 1945-1946. Part III, Colleges and Universities. Federal Security Agency, U. S. Office of Education. Government Printing Office. Washington, 1945.

[2] Total — Journal of the American Dental Association. 31: 1931 (November 1, 1944) American Dental Association. Chicago.

Control — Educational Directory 1945-1946. See footnote 1.

[3] Journal of the American Dental Association. 30: 957 (June 1, 1943) American Dental Association. Chicago.

[4] Total — Engineers' Council for Professional Development: Thirteenth Annual Report for Year Ending September 30, 1945. Engineering Societies Building, 25-33 W. 39th St., New York.

Control — Educational Directory 1945-1946. See footnote 1.

[5] Information not available. Graduates of civil engineering courses with sanitary option are not segregated from all civil engineering graduates.

[6] Total — A List of Schools of Nursing Meeting Minimum Requirements Set by Law and Board Rules in the Various States and Territories. National League of Nursing Education, 1790 Broadway, New York, 1943.

[7] Facts About Nursing — 1945. The Nursing Information Bureau of the American Nurses' Association cooperating with The National League of Nursing Education and the National Organization for Public Health Nursing — 1790 Broadway, New York.

TABLE 2.—*Schools in the continental United States offering graduate degrees or certificates in public health, public health or sanitary engineering, and public health nursing, and number of students receiving degrees or certificates during the academic year 1944-1945*

Type of degree or certificate	Number of schools of designated control offering each type of training[1, 2]				Number of students receiving graduate degrees or certificates from schools of each type of control[1, 2]			
	All controls	State	Local governmental	Nongovernmental	All controls	State	Local governmental	Nongovernmental
Public health	12	6	--------	6	200	112	--------	88
Public health engineering	18	11	--------	7	38	17	--------	21
Public health nursing	30	10	1	19	884	285	31	568

[1] Totals—American Journal of Public Health—Vol. 35, No. 12, December 1945—p. 1253. American Public Health Association, New York.

[2] Control—Educational Directory 1945–1946. Part III, Colleges and Universities. Federal Security Agency, U. S. Office of Education. Government Printing Office, Washington, 1945.

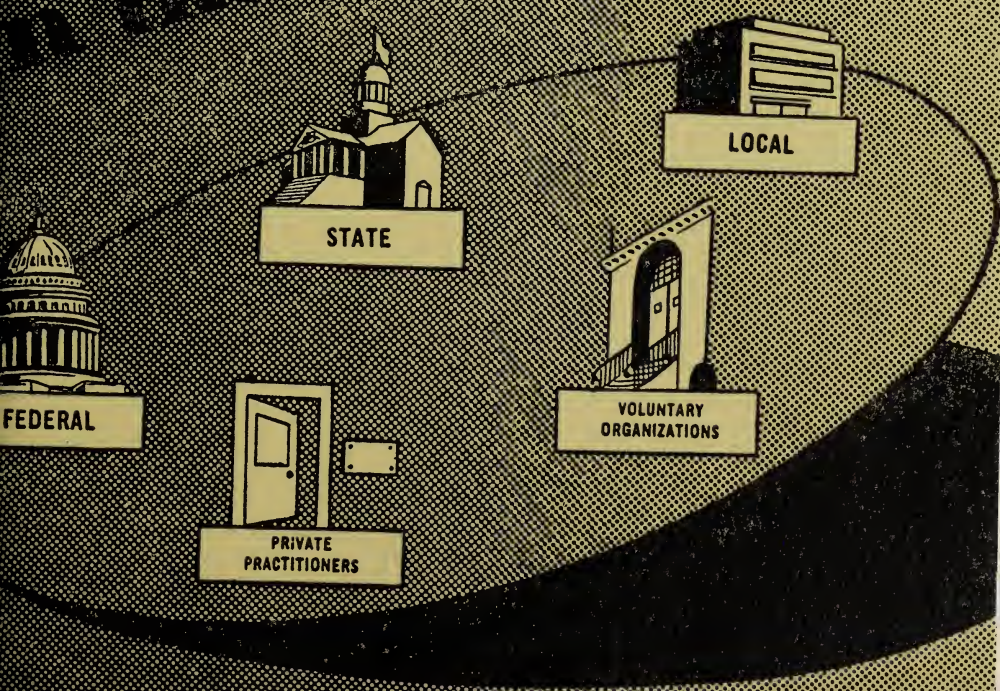
☆U. S. GOVERNMENT PRINTING OFFICE: 1947—693409

614.09
Un3m
no.35
1950

GUIDE

TO HEALTH ORGANIZATION

in the United States



GUIDE
TO
HEALTH ORGANIZATION
IN
THE UNITED STATES

by

JOSEPH W. MOUNTIN, Medical Director

and

EVELYN FLOOK, Administrative Analyst

THE LIBRARY OF THE

FEB 23 1951

UNIVERSITY OF ILLINOIS

FEDERAL SECURITY AGENCY

PUBLIC HEALTH SERVICE

1946

(REPRINTED 1948 AND 1950)

MISCELLANEOUS PUBLICATION No. 35

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 25 cents

W4.09
Un3m
no 35
1950

TABLE OF CONTENTS

	Page
Illustrations	v
Introduction	1
Federal Health Organization	3
State Health Organization	20
Local Health Organization	29
Voluntary Health Agencies	43
Professional Education	47
Summary	48
Bibliography	50
Appendix	56

THE COMPLETE PUBLIC HEALTH STRUCTURE

There are three distinct levels of health organization in the United States; Federal, State, and local. The complete health structure is illustrated here. Following illustrations show channels through which actual health services reach the individual citizens for whom they are designed.

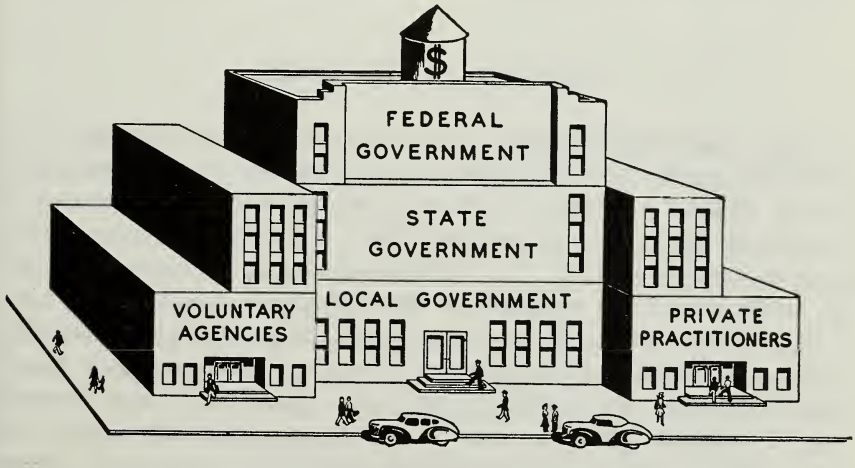


FIGURE 1—LEVELS OF HEALTH ORGANIZATION—The Complete Health Structure

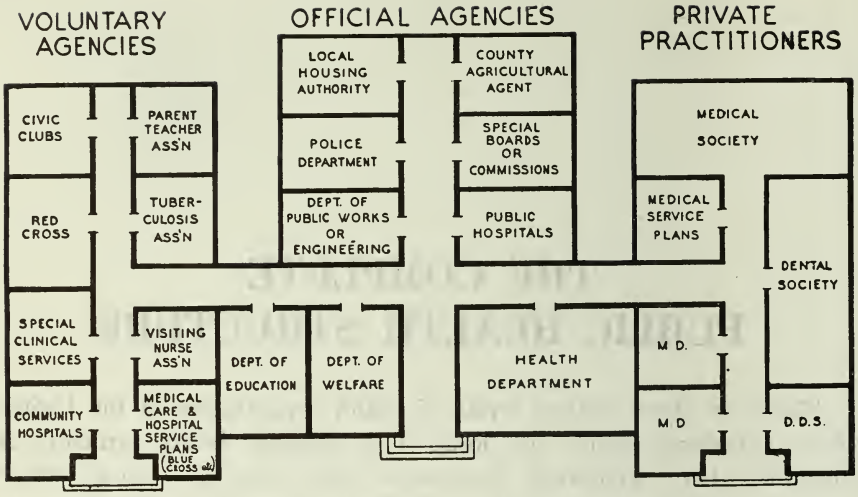


FIGURE 2—LEVELS OF HEALTH ORGANIZATION—The Ground Floor of the Health Structure—Local Official and Voluntary Agencies and Private Practitioners

LOCAL AGENCIES

Private physicians, dentists, and nurses constitute the foundation for individual health services. However, all residents of the community cannot afford the services of private practitioners. Certain elements of community health services originated with a number of public-spirited persons banding together (as voluntary agencies) to furnish the bulk of health service not obtained by the individual's direct efforts. Generally, however, protection of community health is a public responsibility discharged through official agencies of local government. Local health organization has been modeled closely after general local governmental organization. In some sections of the country, the city, town, and municipality constitute the local health jurisdiction. In others, county health departments and multicounty health units, known as local health districts, have flourished. About two-thirds of the total population of the United States is covered by organized local health service under the direction of a full-time health officer.

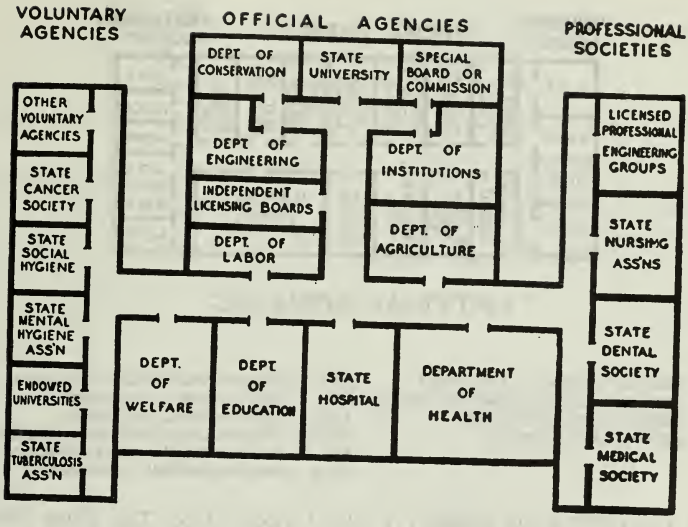
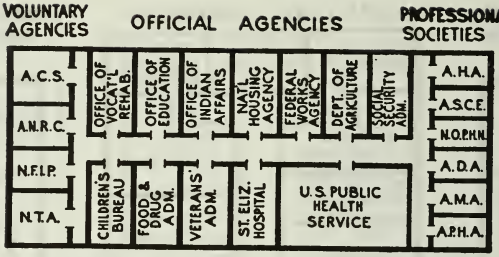


FIGURE 3—LEVELS OF HEALTH ORGANIZATION—The Second Floor of the Health Structure—State Official and Voluntary Agencies and Professional Societies

STATE AGENCIES

Health functions of State official agencies range from regulatory authority or advisory service only to the operation of complex direct service units. More adequate local health service is stimulated through promotional, advisory, and supervisory activities and through financial aid from State and Federal sources for approved health projects. Except for the provision of medical and institutional care, the State health department usually assumes leadership and guidance in the operation of health programs. Other agencies of State government shown here function as contributory bodies or assume responsibility for specific segments of the broader programs sponsored by the State health agency. Voluntary health agencies and professional societies operating on a State-wide basis also occupy a prominent position in the total health structure. Their functions, in relation to official State health agencies, are chiefly exploratory and supplementary.



LEGEND:

N.T.A. - NATIONAL TUBERCULOSIS ASSOCIATION
N.F.I.P. - NATIONAL FOUNDATION FOR INFANTILE PARALYSIS
A.N.R.C. - AMERICAN NATIONAL RED CROSS
A.C.S. - AMERICAN CANCER SOCIETY

A.P.H.A. - AMERICAN PUBLIC HEALTH ASSOCIATION
A.M.A. - AMERICAN MEDICAL ASSOCIATION
A.D.A. - AMERICAN DENTAL ASSOCIATION
N.O.P.H.N. - NATIONAL ORGANIZATION FOR PUBLIC HEALTH NURSING
A.S.C.E. - AMERICAN SOCIETY OF CIVIL ENGINEERS
A.H.A. - AMERICAN HOSPITAL ASSOCIATION

FIGURE 4—LEVELS OF HEALTH ORGANIZATION—The Third Floor of the Health Structure—National Official and Voluntary Agencies and Professional Societies

Federal official agencies are responsible for controlling interstate health hazards and protecting this country from the importation of communicable diseases from abroad. The Federal Government sponsors research and demonstration into the cause, prevention, and control of disease and allots grants-in-aid for the expansion of State and local health services. Designated beneficiaries of the Federal Government receive direct health service. The United States Public Health Service is the chief Federal health agency, but numerous other agencies have certain health interests and responsibilities directly related to their broader functions. The chief contributions of National voluntary agencies and professional societies are program planning, formulating standards, and preparing educational material in their respective fields.

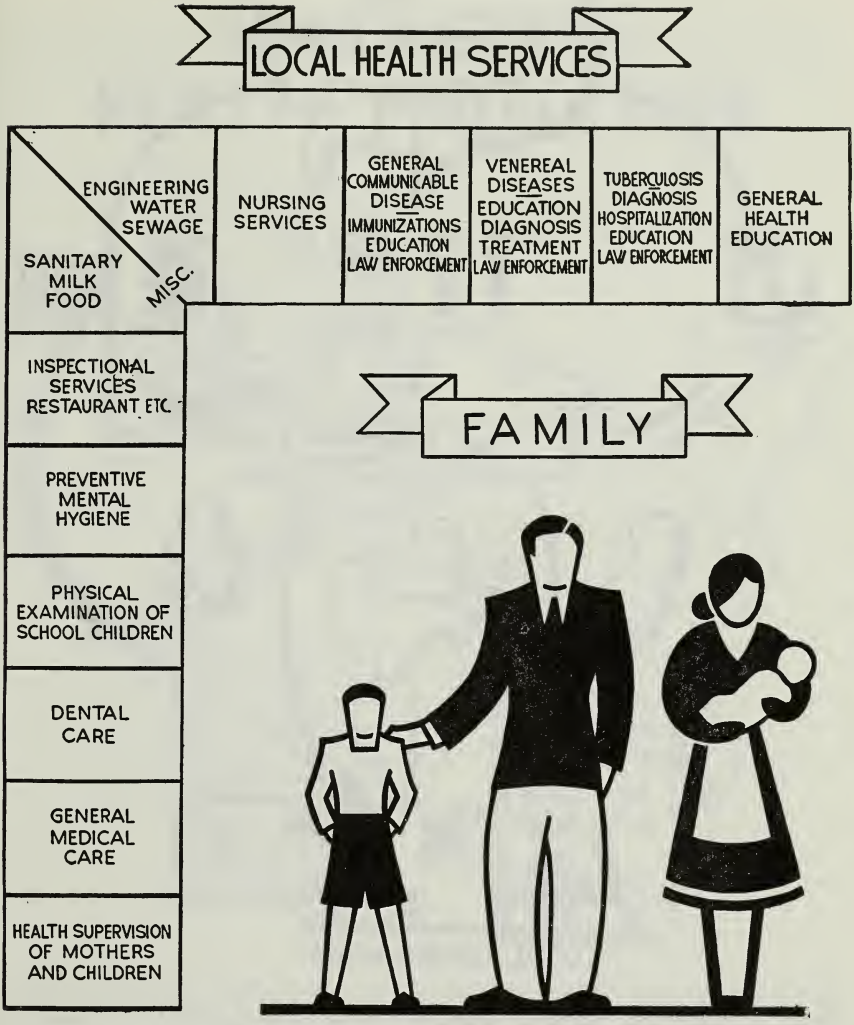


FIGURE 5—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—Local Agencies Operate Directly

The average citizen receives most of his personal health services from a local official or voluntary agency or from his private physician, dentist, and nurse.

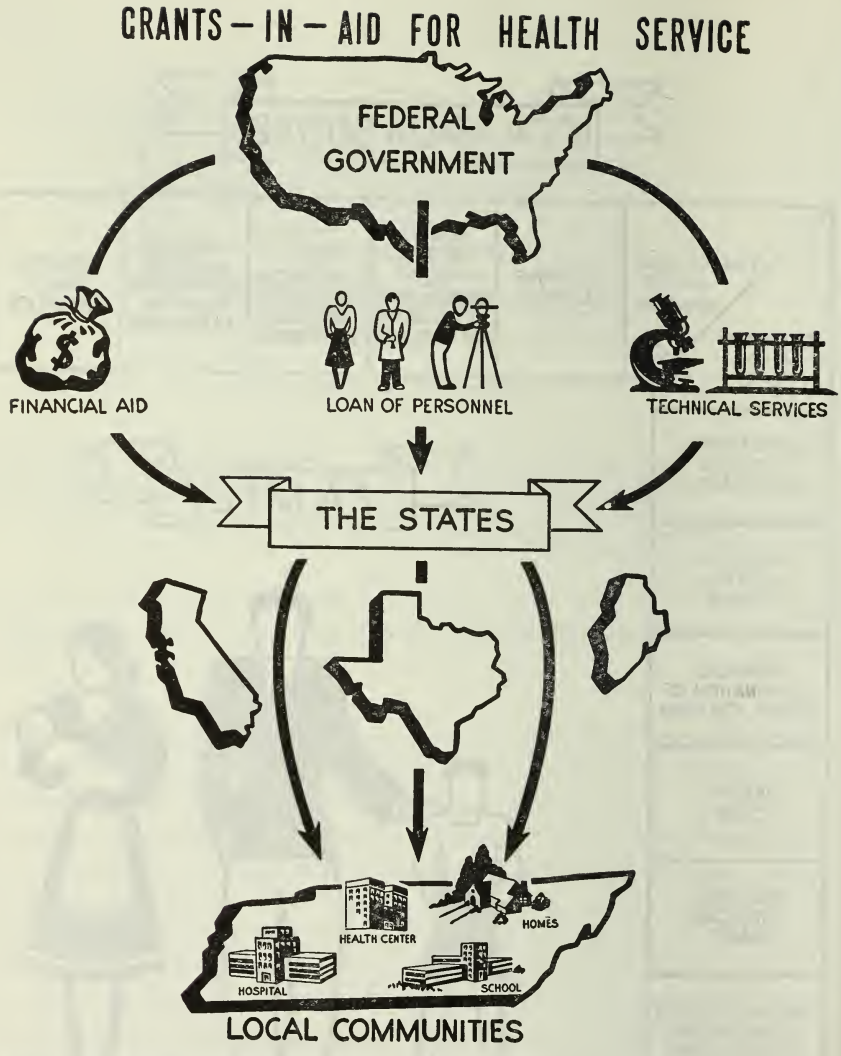


FIGURE 6—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—State and Federal Agencies, Either Directly or Indirectly, Assist the Local Agencies

State agencies assist local agencies in the provision of health services largely through financial aid, loan of personnel, performance of technical services, advice, and supervision. Part of this assistance originates at the State level, while the Federal Government is the source of another portion. Federal aid is extended to the States, then reallocated to the local jurisdictions.

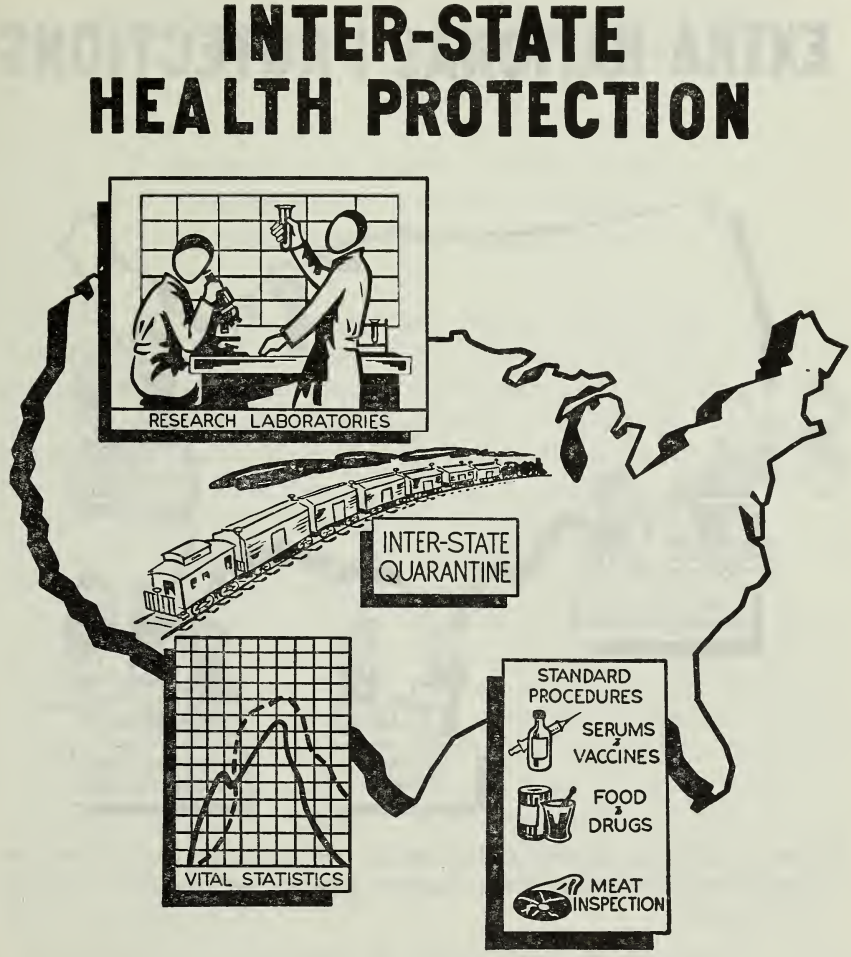


FIGURE 7—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—The Federal Government Functions Directly for Interstate Health Protection

Control of interstate quarantine and health matters involved in interstate traffic, stabilization of the quality of foods and drugs, control of biological products, and maintenance of research laboratories for study of cause and prevention of disease are health functions performed directly by Federal agencies. In some instances, State personnel are delegated to act as agents of the Federal Government in exercising certain interstate controls.

EXTRA-NATIONAL PROTECTIONS

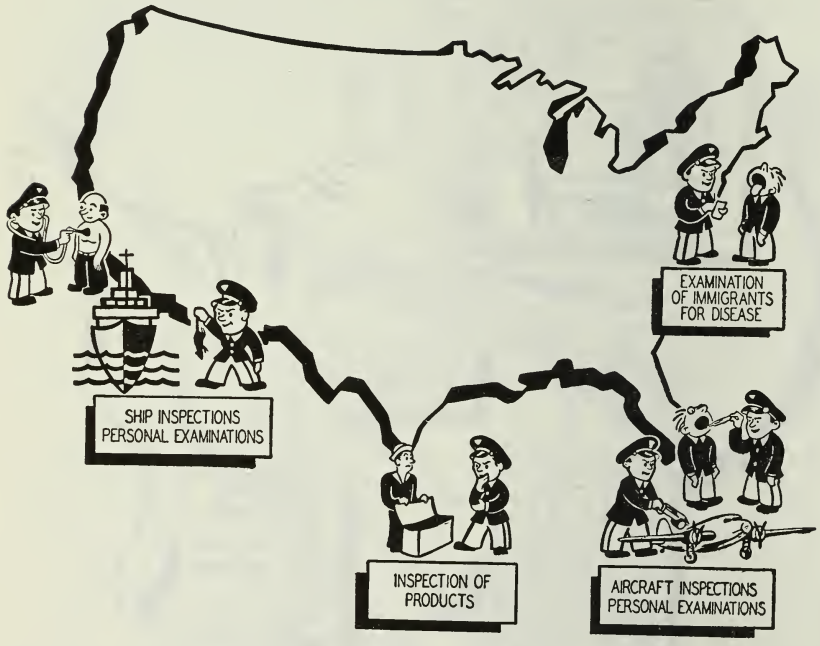

EXAMINATION OF IMMIGRANTS FOR DISEASE
SHIP INSPECTIONS PERSONAL EXAMINATIONS
INSPECTION OF PRODUCTS
AIRCRAFT INSPECTIONS PERSONAL EXAMINATIONS

FIGURE 8—CHARACTERISTIC METHODS OF HEALTH ADMINISTRATION—The Federal Government Functions Directly for Prevention of Disease From Abroad

Protection of this country from the importation of quarantinable diseases from abroad is a direct service of the Federal Government. Control is exercised by means of medical examination of all persons from foreign areas, inspection of ships and planes for sanitary conditions, inspection of products entering the country, and imposition of quarantine restrictions when necessary.

A GUIDE TO HEALTH ORGANIZATION IN THE UNITED STATES[1/2]

By

Joseph W. Mountin, Medical Director, and
Evelyn Flook, Administrative Analyst
United States Public Health Service

At each of the three levels of government, Federal, State, and local, health functions are distributed, without common design, among agencies having a wide variety of major interests and responsibilities. Even the initiated may be confused by the break in continuity of authority and responsibility occasioned by political boundaries which otherwise have little significance in the lives of people. To a person unfamiliar with a federated system of government, contradictions and exceptions seem to characterize the broad scheme of organization—if, in the mosaic, they are able to perceive any coherent pattern.

There is wide variation in the definition of public health, and this is reflected especially in the structure of local health organizations. In many of their operations, health departments seem to stop somewhere short of applying remedial measures. Finding a condition needing attention and bringing it to the notice of the person concerned seems, on superficial examination, to be the end and purpose of public health. The visitor from abroad has difficulty understanding why public health agencies should be divorced from such elemental health measures as removal of refuse, public housing, and various items falling within the general scope of public services.

In the field of medical care the picture is equally confusing. A complete tax-supported service is provided by the Federal Government for the Indians and for veterans of wars, but medical benefits for its own workers are limited to disabilities arising out of employment. The States usually provide domiciliary care for the insane and the tuberculous, but for no others. Localities differ widely in the provision of general medical

[1] From the States Relations Division, Bureau of State Services.

[2] While compilation of the factual material for this article was completed on December 31, 1945, in some instances the most current information available had been collected several years prior to that date. Subject matter covering Federal health organization has been corrected to include provisions of Reorganization Plans No. 2 and No. 3 of 1946, under authority of the Reorganization Act of 1945. In a few instances, substitution of factual data has been made in the reprinted issue for presentation of more current data.

service, but they are alike in confining such provisions to the indigent. Except for limited medical services under workmen's compensation, there is no Federal, State, or local official system of compulsory sickness insurance.

One should not draw the conclusion that if a given service is not performed by the health department it is neglected. A study limited to official health organizations in the United States discloses only a fraction of the total health effort. For example, hospitals of various medical types are apt to be operated by departments of welfare; activities for improvement of sanitation are engaged in by departments of public works; control of animal diseases transmissible to man is a responsibility of departments of agriculture; and housing agencies play their part in the over-all health picture. Perhaps the largest part is arranged by the individual as a matter of course in his daily life. He may be guided in a remote way by the health department; more often he draws on his own basic understanding of hygiene. This is possible because the great mass of the population lives in an environment where sanitation has reached a fairly advanced stage of development. Even commercial agencies render substantial support to the public health by the development and sale of sanitary appliances. Improved methods for the production, processing, and preservation of foods have done much to lessen intestinal disturbances. The fact that public health has in large measure become automatic speaks well for the work of health agencies and in no way detracts from their importance in the total public health program.

Should a person feel the need of medical attention, his first thought is to employ a private physician, and, if necessary, seek hospitalization. Voluntary systems of insurance, a sliding scale of charges, and a measure of public assistance, alone, or in combination, serve to ease the financial burden for the individual. Despite inequalities usually associated with medical and hospitalization services that operate on the basis of a private enterprise, in this country, the great majority of the people obtain a considerable measure of medical care, at least for the more acute conditions.

When the general scheme of health organization is first explained, the visitor or the casual observer often is amazed that it works at all. But it does work, even though at times the processes may seem cumbersome and inefficient. Its high performance is well demonstrated by rather obvious and tangible results. The people of the continental United States now enjoy a level of health and well-being never before attained by any population of comparable size. The trend of both individual and community health has been consistently upward for many years. This upward trend should continue as better methods are devised and given wider application.

The foregoing observations should not be construed to mean that health services in the United States operate without some basic form, even though they are contributed by a multiplicity of agencies. The general plan of health organization in any country must be woven into the framework of government. Also, social policy and tradition determine which problems may be left to the individual, the sphere for voluntary cooperative activity, and which services shall be performed by government either with or without some measure of compulsion. The purpose of this pamphlet is to describe what exists and not to indicate how it might be improved.

From a purely legalistic standpoint, the three levels of government—Federal, State, and local — represent distinct and separate entities. Actually, they constitute a partnership for the protection and promotion of human health. For the most part, the scope of responsibility of all official agencies participating in health work is founded in statutory authorization. Designated agencies of each governmental level are held accountable by specific laws for one or more of the following functions: direct service, regulatory work, popular health instruction, administration of financial grants-in-aid, loan of personnel, or conduct of investigations and demonstrations. From the cooperative effort of Federal, State, and local governments, of voluntary agencies, and of private practitioners, there is woven the total fabric of health service in the United States.

FEDERAL HEALTH ORGANIZATION[3]

Federal agencies contributing to the improvement of human health are, in general, concerned with participation in research, investigations, and demonstrations; administration of grants-in-aid; and regulation of health problems incident to movement of persons and things in foreign and interstate traffic. They study the cause, prevention, and treatment of disease and demonstrate results of their findings to selected communities; make financial grants to States for expansion and improvement of health services administered by either State or local agencies; and exercise the controls necessary to prevent spread of disease from one State to another or from other countries to the United States. Less extensively, Federal functions also include loan of personnel for special or emergency situations and performance of direct service for selected conditions or under particular circumstances.

[3] Material in this section is based largely upon the United States Government Manuals, 1944, 1945, and 1946(1) supplemented by information from other official publications as indicated by bibliographic reference.

Federal Security Agency

Major health functions of the Federal Government are carried on by constituent units of the Federal Security Agency. The first step toward grouping several governmental units with a mutual interest in the related fields of health and welfare was taken when the Agency was established for that purpose under Plan No. I of the Reorganization Act of 1939 (2). In 1940, Plans No. II and No. IV brought together under the same administration additional Federal organizations operating in some field of health. Under the most recent reorganization plan, which became effective July 16, 1946, there has been still further consolidation of Federal agencies engaged in health activities. The specific health functions of each component unit of the Federal Security Agency may be summarized as follows:

United States Public Health Service

The United States Public Health Service is the principal Federal health agency. It engages in extensive health programs in cooperation with States, other Federal agencies, governments of foreign nations, and international agencies. Its affairs are administered by the Surgeon General and assistant surgeons general in charge of designated administrative bureaus, to which are delegated specific functions by the Surgeon General. Officers of the Regular Corps of the Public Health Service are commissioned by the President, with the advice and consent of the Senate, after passage of an examination given according to professional category in the several branches of medicine, dentistry, sanitary engineering, pharmacy, nursing, or related scientific specialties in the field of public health. The commissioned Regular Corps is supplemented by a reserve corps which may be activated in an emergency. Some specialized professional positions, as well as custodial, clerical, fiscal, and many of the administrative positions are filled by civil-service employees.

The principles of cooperation and assistance are observed by the Public Health Service in most of its functions, largely exercised through demonstrations, advice on technical matters, and loan of officers to State and local health departments and to other Federal agencies with particular health interests. The greatest assistance is given through financial grants to State and Territorial health agencies for expansion and improvement of their programs. The relationship between the Public Health Service and State health organizations is exceedingly close.

The broad powers and duties of the Public Health Service are delineated in the Public Health Service Act of 1944 and amendments thereto (3). Outstanding functions of the Service are listed at this point:

1. Study of the causes and means of propagation and spread of the diseases of mankind, and the development of methods of prevention

and control. In this work the Public Health Service maintains several research laboratories, chief among which are those of the National Institute of Health, including the National Cancer Institute. In addition to investigations carried on at the Institute and its field stations, financial assistance is given through research grants to universities, laboratories, and other public and private institutions for research projects, upon recommendation of Service advisory councils. Funds are also available for research fellowships, both in the Institute and in various university medical schools.

2. Maritime quarantine and inspection of passengers and crews of vessels and airplanes arriving from foreign ports, for protection of the country from the importation of quarantinable diseases from other countries. Examination of immigrants for detection and isolation of persons suffering from mandatorily excludable disease. Medical inspection of aliens is performed in collaboration with the Immigration and Naturalization Service of the Department of Justice.

3. Interstate quarantine for prevention of the spread of diseases from State to State. The Federal health agency prescribes conditions under which persons and things may move in interstate commerce. It assists States in controlling epidemics and may, on request, take complete charge of serious outbreaks. Regulation of conditions existing within the boundaries of a particular State is a duty that remains under State jurisdiction.

4. Dissemination of public health information, including collection and publication of reports of disease prevalence in the United States and foreign countries, and other pertinent information regarding conservation of the public health.

5. Assistance, through grants to States, counties, cities, and health districts, in establishing and maintaining proper sanitation facilities, general public health services—including industrial hygiene, mental hygiene, and cancer control—and special programs for the control of the venereal diseases and tuberculosis. Grants made under this authority represent the actual transfer of funds from Federal to State treasuries for employment and training of personnel for State and local health work, purchase of supplies and equipment, provision of appropriate facilities for care and treatment of designated illnesses, and payment of general operating expenses. Services include the loan of personnel for temporary duty, and the provision of consultation and advice to State and local health departments. Assistance is also furnished States in the development of hospitalization plans and construction of hospital and allied health facilities.

918272°—51——3

6. Supervisory control and licensure of the manufacturers of biological products — vaccines, serums, toxins, antitoxins, arsenicals, and similar preparations — used in the prevention and treatment of diseases. This control has been established to insure safe and standard products.

7. Study of mental diseases and drug addiction and investigation of legitimate needs for narcotic drugs.

8. Provision of hospitalization, general medical and dental care, and preventive health services for American merchant seamen, members of the United States Coast Guard and the Coast and Geodetic Survey, and for other legal beneficiaries of the Service. In this connection, the Service operates 26 marine hospitals and 120 other medical relief stations and contracts for service with 133 hospitals located in places not served by marine hospitals. It assigns medical and dental officers to ship duty to provide medical and dental care at sea for the Coast Guard and Coast and Geodetic Survey. The Public Health Service, in cooperation with the Bureau of Prisons, also maintains a medical and health program in Federal prisons. The medical division of the Office of Indian Affairs, the agency charged with administration of medical care and public health services for Indians, is staffed by Public Health Service officers on detail to that organization.

9. Operation of special hospitals—the National leprosarium and two hospitals specifically for the care of mental patients and persons addicted to the use of narcotics.

10. Administration of a wartime nurse training program in accordance with provisions of the Bolton Nurse Training Act (4). This Law provided for recruitment and training of nurses through grants to institutions providing training for students in basic nurse education, refresher courses, and in postgraduate education, including intensive short courses. (Recruitment ended immediately after VJ Day, 1945, and enrollment ceased after October 15, 1945 in accordance with instructions from the President and the Congress.) Students participating in the training program enrolled on or before October 15, 1945 may complete their course under the Federal scholarship.

11. Cooperation with other Federal agencies in discharging their various health functions, through assignment of personnel for assistance.

12. Participation in the organization and subsequent functioning of international health organizations. In carrying out this service,

particular attention is given to the direction of programs for the exchange of international health and related personnel and supervision of health missions to foreign countries.

13. Collection and publication of data on vital statistics (5), which are basic materials for public health programs and give valuable information concerning public health trends. Through measurement of death rates from different causes, the progress of health programs directed toward reduction of particular diseases or conditions can be evaluated.

St. Elizabeths and Freedmen's Hospitals

St. Elizabeths Hospital (6) is the principal hospital for treatment of mentally ill civilian beneficiaries of the Federal Government. Freedmen's Hospital (7) is a general hospital with specialized departments. It is affiliated with the Howard University Medical School. Both of these hospitals are under the direction of the Surgeon General of the United States Public Health Service.

Social Security Administration—*Children's Bureau*

From a dimensional standpoint, the Children's Bureau perhaps ranks next to the United States Public Health Service as a Federal agency engaged in health activities. Under authority of title V, part 1, of the Federal Social Security Act of 1935 (8), the Children's Bureau was made responsible for allotment of Federal funds to the States for the purpose of enabling each State to extend and improve health services available for mothers and children. These funds are used to assist in the support of prenatal and postnatal clinics, of demonstration delivery services, of well-child conferences, and of public health nursing services for maternity and child health supervision. Through these grants, dentists and nutritionists are also employed by States and localities for services to mothers and children who attend the clinics.

During the recent war this program has been expanded to provide maternity care for wives and pediatric care for infants of enlisted men in the four lowest pay grades of each branch of the armed forces. This Emergency Maternity and Infant Care program is financed by special appropriation, but within the framework and under the general authority of title V of the Social Security Act.

A cooperative Federal-State program of services for crippled children is also sponsored by the Children's Bureau under authority of title V, part 2, of the Social Security Act (8). This program, like the one for extension of general health services to mothers and children, is based on Federal grants to the States. However, the health department is not always the State agency responsible for administration of the program for crippled children. In addition to health departments, State agencies

with which the Children's Bureau cooperates in administration of programs of service for crippled children are: departments of welfare, departments of education, special crippled children's commissions, and State university hospitals. The Children's Bureau consults with the State agencies in the development of their programs and provides them with the advisory service of nationally recognized leaders in the professions involved. Federal grants earmarked for crippled children's services are used for locating crippled children; for providing medical, surgical, corrective, and other services and care; and for obtaining facilities for diagnosis, hospitalization, and aftercare of children who are crippled or who are suffering from conditions that lead to crippling.

United States Office of Education

By participation in workshops for the training of teachers, the United States Office of Education (9) stimulates public health education and school health programs, since classroom teachers hold a key position for dissemination of accurate information regarding health matters. School health programs sponsored by the Office of Education tend to combine instruction in health with instruction in safety and with physical education activities. Some research is conducted by this agency to obtain information concerning the effect the physical plant of the school has upon the health of children. Medical examination of school children and teachers and school lunch programs are also subjects of investigation and recommendation. Through the grant-in-aid program for vocational education administered by this agency, training for health personnel below college grade has been provided. Outstanding among such groups are laboratory aides and technicians and practical nurses.

Office of Vocational Rehabilitation

The comprehensive program of the Office of Vocational Rehabilitation (10) covers, in addition to its strictly vocational features, medical diagnosis and physical restoration, including hospitalization, of permanently disabled civilians.

Social Security Administration—*Bureau of Public Assistance*
Research and Statistics

Through its several programs of financial assistance, the Bureau of Public Assistance of the Social Security Administration (11), in cooperation with State and local official welfare agencies, indirectly bears some of the medical costs of three designated needy groups, persons eligible for old-age assistance, dependent children, and those who are blind. Purposes for which a person may receive assistance include such essentials as food, shelter, clothing, replacement of household furnishings, and costs of anticipated medical care. However, in determining the amount of assistance to which clients of these programs are entitled, no allowance is made for costs of unpredicted illnesses.

Research in the administrative aspects of health and medical care is engaged in by the Social Security Administration's Bureau of Research and Statistics. Reports of the studies made by this bureau have been a significant factor in demonstrating the need for extension of some health services now operating and for organization and establishment of additional types of services.

Food and Drug Administration

The Food and Drug Administration (12) is the main Federal organization which safeguards the quality of foods and drugs. Activities of this agency are directed chiefly toward promoting purity, standard potency, and truthful and informative labeling of commodities covered by the Food, Drug, and Cosmetic Act (13), the Tea Act (14), Import Milk Act (15), Caustic Poison Act (16), and Filled Milk Act (17). Inspecting factories where foods, drugs, and cosmetics are manufactured or processed, testing samples of products covered by the aforementioned Acts, and checking the results of such tests against the labeling statements are the means employed by the Food and Drug Administration in fulfilling its law-enforcement responsibility for protecting the public against fraudulent claims concerning various foods and drugs.

Bureau of Employees' Compensation

Finally, medical and hospital care for Federal employees injured in line of duty is provided by the Bureau of Employees' Compensation (18). Such care is an integral part of the system of workmen's compensation benefits for civil employees of the Federal Government.

Federal Trade Commission

Under the Federal Trade Commission Act (19), this Commission is active in preventing improper statements for advertising foods and drugs in interstate commerce. Duties of this agency differ from those of the Food and Drug Administration with respect to advertising claims in that the Federal Trade Commission is interested in all forms of advertising, whereas the Food and Drug Administration is chiefly concerned with accuracy of statements made on package labels.

Department of Labor

Administration of the child labor provisions—including establishment of minimum age limits for employment, designation of maximum working hours for children in industry, and definition of hazardous occupations—of the Fair Labor Standards Act (20) is a function of the Division of Labor Standards of the Department of Labor. This division also promotes health and safety programs in industrial plants. Particular

emphasis is placed upon safety measures for the prevention of industrial accidents and upon general working conditions.

The Women's Bureau, another branch of the Department of Labor, prescribes working conditions affecting the health of women in industry.

In an incidental fashion, the Bureau of Labor Statistics touches upon the health of workers through receipt of reports of occupational injuries, which sometimes include illnesses. This information is not collected in the interest of health problems as such but as part of the bureau's study of many factors affecting the welfare of labor groups.

Department of Agriculture

Several branches of the Department of Agriculture participate in activities significant to human health. In this organization, too, some health functions are regulatory, some investigatory, and some carried out on a cooperative basis with State and local governmental units. The Bureau of Animal Industry (21) conducts scientific investigations of the cause, prevention, and treatment of diseases and parasites of domestic animals—many of which are transmissible to man—and directs or aids in their control or eradication. Such control is carried on in cooperation with State officials and livestock organizations through development and application of improved measures for preventing outbreaks of diseases and parasitic infestations and for controlling any that occur.

The Office of Production and Marketing Administration, another unit of the Department of Agriculture, administers a meat inspection service which is a regulatory health function. Under authority of the Meat Inspection Act (22), meat sold in interstate or foreign commerce or by firms supplying Government agencies is inspected for freedom from disease and for wholesomeness for human consumption. The Office of Production and Marketing Administration also controls insecticides through administration of the Insecticide Act (23). In addition, this office formulates official standards for various food products which serve as a yardstick for measuring gradations of quality. The Labor Branch (24) of the Office of Production and Marketing Administration finances medical care and health services for seasonal workers imported from other countries for farming communities.

The Bureau of Dairy Industry (25) engages in studies for the development of sanitary methods of handling milk on the farm, in transit, and in dairy plants. Recommendations based on the results of such studies are disseminated among dairying groups by various educational methods.

Insects, including those that affect man, are objects for both study and control by the Bureau of Entomology and Plant Quarantine (26). This bureau cooperates closely with the Public Health Service and appropriate units of the military agencies in the investigation and control of disease-bearing insects.

The Bureau of Human Nutrition and Home Economics (27) conducts research on food and other materials essential to healthful, everyday living, with special emphasis on studies of American dietary habits as related to nutrition standards. Findings from this research are made available through bulletins, press releases, radio talks, and exhibits, and through the planned educational programs conducted by extension agents throughout the country.

By means of grants-in-aid, the Extension Service (28) cooperates with State land-grant colleges in administering the educational activities of a corps of county extension and home demonstration agents located in nearly all agricultural counties. These county agents work with groups of farmers, rural homemakers, and rural youth clubs in stimulating increased production, proper conservation, and wiser utilization of food. They also serve as advisers to these groups with respect to approved methods for attaining these objectives.

Still another member agency of the Department of Agriculture, the Farm Security Administration (29), contributes to the health and welfare of low-income farmer groups by including medical and dental care among the purposes for which Government loans can be obtained through this agency. The needed medical and dental care is made available to borrower families through county-wide group health services set up by the Farm Security Administration in cooperation with local physicians and dentists. The group health services so established have recently been extended to include limited public health activities, particularly farm sanitation.

Federal Works Agency

Public construction of Government hospitals is a direct function of the Federal Works Agency (30). The grant-in-aid programs for stimulation of employment administered by this organization contribute to expansion of community health and sanitation facilities since the Federal Works Agency provides financial aid and otherwise assists in the construction and remodeling of water and sewerage works, hospitals, health centers, and other similar facilities.

National Housing Agency

Adequate housing is highly significant to community health. Functions of constituent units of the National Housing Agency, operating under authority of the National Housing Act of 1934 and subsequent amendments (31), are designed to improve existing housing facilities for low-income groups and to promote construction of new low-cost housing facilities which will meet sanitary and health requirements and maintain property values on a sound fiscal basis. Particularly is this agency

concerned with expediting construction of and maintaining price control over homes for veterans. The program involves, especially, expanded production of materials; postponement of deferrable and nonessential construction; re-use of war housing; control of priorities and allocation of materials to home builders; and channeling materials into dwelling units for the low-income group. Of primary concern to the National Housing Agency is the impact of the program on existing essential sanitary utilities, and the provision of adequate utilities where existing facilities are not available.

The Federal Public Housing Authority, the branch of the National Housing Agency primarily concerned with the provision of public housing, financially aids local public housing agencies in the development and administration of low-rent housing and slum clearance. Such aid is in the form of capital loans and annual subsidies to the local housing authorities. During the war, the Federal Public Housing Authority was authorized to construct and operate family housing units or dormitories in localities where such projects were needed to meet acute shortages brought about by industrial activity essential to prosecution of the war. Infirmaries and medical care clinics were maintained and limited health programs were operated in these public housing projects. Since the war, the Federal Public Housing Authority has engaged in moving surplus war housing to points where it will better serve the housing needs of veterans.

The Federal Housing Administration, another unit of the National Housing Agency, encourages private construction, repair, and improvement of homes by offering, within a stated limit, insurance to private lending institutions on loans made to individuals or corporations. Loans secured by mortgages on residential properties are also guaranteed by this agency. Originally, mortgages were guaranteed only on one-to-four-family dwellings for sale or rent, but as a war measure security was extended to large-scale building projects constructed as homes for war workers. The Federal Housing Administration also insures loans to veterans for purchase of homes. The standards of home sanitation established by this agency must be met by all dwellings for which loans are approved.

The Federal Home Loan Bank Administration, also a part of the National Housing Agency, provides a national credit reserve for home financing institutions through the Federal Home Loan Bank System and its regional banks.

Department of the Interior

The Bureau of Mines (32) in the Department of the Interior conducts an accident prevention campaign through investigation of the causes

of mine accidents and by instructing operators and miners in accident prevention, mine rescue, and recovery work. The Bureau of Mines also conducts studies on the elimination and control of health hazards in the mineral industries.

The Fish and Wildlife Service (33) contributes to health protection by promoting programs for destruction of rodents, some of which are known vectors of disease. Detection and elimination of pollution hazards to lakes and streams are also functions of the Fish and Wildlife Service. Although the purpose of this activity is protection of fish life, corrections obtained are beneficial to humans as well.

Services of the aforementioned Federal agencies for the most part influence the health of the community as a whole. A second group of Federal agencies operates health and medical care programs that are restricted either to personnel making up the organization, or to persons whom the agency was established to serve in a general way. Such programs include consideration of health as well as other needs. In the latter category, the Office of Indian Affairs (34) of the Department of the Interior may be listed first. This office has a medical division for administering medical care and public health among the Indian wards of the Government. Operation of hospitals and general improvement of health and sanitation on Indian reservations are the principal functions of this division.

Tennessee Valley Authority

The Tennessee Valley Authority (35) maintains a medical and health service for its employees and advises communities affected by its operations. It also engages in activities for malaria and mosquito control and engages in public health education in areas served by its utilities.

United States Maritime Commission

Public health and sanitation programs of Government-owned shipyards and of other industrial facilities engaged in the construction of vessels are promoted and operated by the United States Maritime Commission (36), the agency responsible for development of the Nation's merchant fleet.

War Shipping Administration

Responsibility for operating training stations for men of the Merchant Marine was transferred to the War Shipping Administration (37) as an emergency war measure; however, the service is not of a temporary nature and is therefore included here. Health programs of the training stations include water and milk sanitation, immunization of trainees,

medical treatment for minor illnesses of the men in training, and periodic physical examination to determine their fitness for sailing. Medical care on shipboard is administered by physicians employed by the shipping company or by trained pharmacist's mates assigned to each ship. In cooperation with the United Seaman's Service, a voluntary agency, the War Shipping Administration bears a partial cost of operating rest homes for merchant seamen.

Army and Navy

Through their hospital, medical, nursing, and sanitary corps, the Army (38) and Navy (39) administer complete health and medical care programs, including hospitalization, for members of their respective forces.

Veterans Administration

The Veterans Administration (40) maintains hospital, medical, and nursing services for persons discharged from the armed forces. Primary consideration is given service-connected disabilities in the provision of such care.

Under the "GI Bill of Rights," administered by the Veterans Administration, educational opportunities of various kinds are made available to discharged veterans. Training of health personnel is stimulated through this program.

Emergency War Agencies

During the period of National Emergency still other Federal agencies were assigned by act of Congress or by Executive order specific duties having health significance in time of war. Most of these agencies, or at least their contributions to the field of health, were temporary in character. At the writing of this pamphlet, activities of several have already been drastically curtailed. These are included, however, to demonstrate the flexibility with which health organization in the Federal Government accommodates itself to unusual circumstances.

Responsibility for coordination of health, welfare, and other related activities affecting the national defense was placed in the Office of Community War Services when it was established in the Federal Security Agency (41). The primary objective of the Office of Community War Services has been to help communities in congested areas provide for families and individuals health services, medical care, recreation, education, and social protection. Since the end of the war, these activities have been somewhat reduced in scope and changed in emphasis.

TABLE 1.—*Federal agencies engaged in health work*

Participating agency	Health function	Method of administration[1]
Federal Security Agency:		
U. S. Public Health Service[2]	Maintenance of research laboratories for study of cause, prevention, and treatment of disease.	Studies and demonstrations.
	Protection of this country from the importation of communicable diseases from abroad.	Direct service. Regulation.
	Control of interstate quarantine and health matters involved in interstate traffic for prevention of the spread of communicable diseases among the States.	Direct service. Regulation.
	Public health education and dissemination of public health information.	Direct service. Grants-in-aid.
	Assistance in establishing and maintaining proper sanitation facilities, general public health services—including industrial hygiene, mental hygiene, and cancer control—and special programs for the control of the venereal diseases and tuberculosis.	Grants-in-aid. Loan of personnel. Studies and demonstrations. Advisory service.
	Assistance to States in development of hospitalization plans and construction of hospital facilities.	Grants-in-aid.
	Supervisory control and licensure of biological products used in the prevention and treatment of diseases.	Regulation.
	Study of mental diseases and drug addiction and investigation of legitimate needs for narcotic drugs.	Studies and demonstrations.
	Provision of hospitalization, general medical and dental care, and preventive health services for American merchant seamen, members of the United States Coast Guard and Geodetic Survey, and other legal beneficiaries of the Service.	Direct service.
	Operation of special hospitals (leprosarium and narcotics hospitals).	Direct service.
	Administration of a nurse training program for the basic and postgraduate education of nurses (wartime activity only).	Recruitment. Grants-in-aid to nursing schools.
	Assistance to other Federal agencies in the discharge of their health functions.	Loan of personnel
	Collaboration with official and nonofficial national and international agencies in matters concerned with international health problems.	Direct service.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

[2] Agencies to which U. S. Public Health Service officers are detailed for assistance in administration of the functions described.

TABLE 1.—*Federal agencies engaged in health work* (continued)

Participating agency	Health function	Method of administration[1]
Federal Security Agency (continued):		
U. S. Public Health Service[2] (continued)	Collection and publication of data on vital statistics.	Direct service. Advisory service.
St. Elizabeths Hospital	Provision of care and treatment for civilian beneficiaries of the Federal Government suffering from mental disorders.	Direct service.
Freedmen's Hospital	Provision of treatment for general and allied special illnesses of Negroes in the District of Columbia and surrounding areas.	Direct service.
Social Security Administration—Children's Bureau	Assistance to States for improvement of maternal and child health. Assistance to States for crippled children's serviees. Administration of maternity and infant care program for wives and babies of enlisted military personnel.	Grants-in-aid. Grants-in-aid. Grants-in-aid.
U. S. Office of Education	Stimulation of public health education and school health programs. Vocational education of practical nurses, laboratory aides and technicians, and other nonprofessional health personnel.	Studies and demonstrations. Advisory service. Participation in training of teachers for health instruction.
Office of Vocational Rehabilitation	Cooperation with the States in rehabilitating persons who are vocationally handicapped by permanent disability caused by accident, disease, or congenital defect.	Grants-in-aid. Grants-in-aid. Advisory service.
Social Security Administration—Bureaus of Public Assistance and Research and Statistics	Assistance to States and political subdivisions for general relief of three designated groups of needy clients. Such relief includes, among other provisions, allowance for predictable costs of medical care. Studies of illness and medical care.	Grants-in-aid. Statistical research.
Food and Drug Administration	Stabilization of the quality of foods and drugs through inspection, analysis, and control of labeling.	Regulation.
Bureau of Employees' Compensation[2]	Provision of medical care for Federal employees injured in line of duty.	Direct service.
Federal Trade Commission	Prevention of improper advertising of foods and drugs in interstate commerce.	Regulation.
Department of Labor:		
Division of Labor Standards	Establishment of restrictions on hours, age, and kind of work for employment of children. Stimulation of health and safety programs in industrial plants.	Regulation. Studies and demonstrations. Advisory service.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

[2] Agencies to which U. S. Public Health Service officers are detailed for assistance in administration of the functions described.

TABLE 1.—*Federal agencies engaged in health work* (continued)

Participating agency	Health function	Method of administration[1]
Department of Labor (continued):		
Women's Bureau	Prescription of required working conditions affecting the health of women in industry.	Regulation.
Bureau of Labor Statistics	Collection and publication of reports of industrial injuries.	Investigations and studies. Educational work.
Department of Agriculture:		
Bureau of Animal Industry Bureau of Entomology and Plant Quarantine	Investigation and control of the cause, prevention, and treatment of diseases and parasites of domestic animals and of insects affecting man.	Studies and demonstrations. Payment of indemnities. Regulation.
Office of Production and Marketing Administration—Livestock Branch	Inspection of meat sold in interstate and foreign commerce, establishment of standards for various food products, and control of insecticides.	Regulation.
Labor Branch	Provision of medical and health services for seasonal workers imported by this office for aid in harvesting food crops.	Direct service.
Bureau of Dairy Industry	Promotion of dairy industry and development of sanitary methods of handling milk.	Direct service. Studies and demonstrations. Direct service.
Bureau of Human Nutrition and Home Economics	Conduct of research on food and other goods essential to healthful everyday living and dissemination of information obtained.	Studies and demonstrations.
Extension Service	Stimulation of increased production, proper conservation, and wiser utilization of food through education of rural population groups.	Popular education.
Farm Security Administration[2]	Operation of a medical care program among low-income farmer groups..	Grants-in-aid. Loans to individuals.
Federal Works Agency	Development of employment programs through construction projects which include the building and remodeling of health facilities and hospitals.	Grants-in-aid.
	Construction of government hospitals and health facilities.	Direct service.
Department of the Interior—Bureau of Mines:		
Health and Safety Service	Investigation of causes of mine accidents and instruction in accident prevention and mine rescue and recovery work.	Studies and demonstrations.
Fish and Wildlife Service	Promotion of programs for destruction of rodents. Detection and elimination of stream pollution hazards.	Popular education. Direct service.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

[2] Agencies to which U. S. Public Health Service officers are detailed for assistance in administration of the functions described.

TABLE 1.—*Federal agencies engaged in health work* (continued)

Participating agency	Health function	Method of administration[1]
Department of the Interior (continued):		
Office of Indian Affairs[2]	Administration of medical care and public health among Indian wards of the Government.	Direct service.
National Housing Agency[2]:		
Federal Public Housing Authority[2]	Financial assistance to local public housing agencies in the development and administration of low-rent housing and slum clearance.	Grants-in-aid..
Federal Housing Administration	Insurance of loans made by private lending institutions for repair or improvement of existing homes and for building of new dwellings	
	Guarantee of mortgages. Insurance of loans to veterans for purchase of homes.	Direct service.
Tennessee Valley Authority[2]	Malaria and mosquito control.	Direct service.
	Maintenance of a medical and public health service for employees and an advisory health service to communities affected by operations of the organization.	Direct service. Advisory service.
U. S. Maritime Commission[2]	Promotion of public health and sanitation programs in shipyards and industrial facilities under its control.	Direct service.
War Shipping Administration[2]	Operation of health and sanitation program at training stations for men of the merchant marine.	Direct service.
War Department:		
United States Army[2]	Operation of health and medical care program for all Army personnel.	Direct service.
Department of the Navy:		
United States Navy[2]	Operation of health and medical care program for all Navy personnel.	Direct service.
Veterans Administration:		
Medical and Hospital Service	Maintenance of a complete medical care program, including hospitalization, for former members of the military and naval forces.	Direct service.
Vocational Rehabilitation and Training Division	Provision of training for persons discharged from the armed forces. Through this program, more trained personnel will be made available for health work.	Direct payments for training.

[1] As used here, "direct service" refers to services actually performed or directly purchased by the designated Federal agency; "grants-in-aid" are funds allocated by the Federal agency to State or local agencies for performance of service; advisory service is limited to the giving of advice and setting of standards.

[2] Agencies to which U. S. Public Health Service officers are detailed for assistance in administration of the functions described.

The War Relocation Authority (42) of the Department of the Interior as part of its program of relocating Japanese and other war-affected groups maintained a medical care and public health program.

The Committee for Congested Production Areas (43) stimulated public health and sanitation programs in selected war areas.

The Office of Civilian Defense (44) established medical services for use in the event of enemy action affecting the civil population.

Arrangement for special research and development in medical and public health fields associated with national defense and prosecution of war is a function of the Office of Scientific Research and Development (45).

The Selective Service System (46) through data collected in its physical examinations of draftees has made information available concerning the health status of the population. These facts and figures have been used as a basis for planning more intensive health programs of particular types.

The War Food Administration (47) instituted an extensive nutrition program throughout the United States.

Agencies with International Health Functions

Since political interests in general are now international as well as domestic in scope, health interests have expanded accordingly. The Federal Government, recognizing its responsibility for assisting in international health programs has delegated various aspects of this cooperative work to the State Department (48), the Office of Inter-American Affairs (49), the Pan American Sanitary Bureau (50), and the Anglo-American Caribbean Commission (51). In the United States Public Health Service there has been established an office of International Health Relations.

For ready reference a tabular presentation (Table 1) identifying the Federal agencies participating in health work, designating the range of activity of each, and specifying the main pattern of administration is included. Those to which Public Health Service personnel are detailed are denoted by footnote. In this tabulation, agencies having war time emergency functions only are omitted.

Cost of Federal Health Services (52)

It was thought that appropriations made by Congress to the respective Federal agencies for the health services described would furnish one tangible expression of the magnitude of the several programs. However, since the health activities of most agencies other than the Public Health Service are so closely interwoven with functions that have no particular health significance, the number of agencies is limited for which appropriations chargeable to health could be isolated. This fact in itself demon-

strates the difference between health programs that are organized as such and activities that have only an incidental influence upon health. Appropriations to the main Federal health agency, the United States Public Health Service, for the fiscal year 1945 totaled approximately $138,309,000 for its broad health program. Of this amount, grants to States for health services of various kinds and training of nurses represented the two leading items of expense. The Labor Department received nearly $78,782,000 for carrying on its general health services for mothers and children, crippled children, and emergency maternity and infant care. This, of course, was prior to transfer of the Children's Bureau to the Federal Security Agency. Over $6,588,000 was appropriated to the Department of the Interior for designated health and safety services. About $3,287,000 was allotted to the Food and Drug Administration. The entire program of this agency has a distinct bearing upon health. St. Elizabeths Hospital received an appropriation of $2,606,000 and Freedmen's Hospital, $829,000. Other Federal agencies engaging in activities related to health support them out of funds which cannot be identified.

Review of the method of administration employed by the various Federal agencies engaged in health services reveals that for the most part direct Federal service is restricted to selected groups of beneficiaries. Services that are set up for the community as a whole are usually channeled to the recipient through agencies of State and, in some instances, local government. Such avenues of approach find a parallel in the general plan of government in the United States. When Federal services reach the individual client by an indirect rather than a direct route, Federal responsibility is usually discharged through grants-in-aid. In exercising regulatory control, Federal agencies may pursue their own enforcement activities or they may cooperate with State authorities. It is necessary, therefore, that one have an understanding of State organization for health services before he can fully comprehend the ultimate workings of Federal agencies.

STATE HEALTH ORGANIZATION

Within a single State, health services may be dispersed among numerous separate agencies of State government. Among the 48 States, this number is multiplied many times over, since there is no common assignment of functions or responsibilities to a particular agency. With few exceptions there is little evidence that the pattern established in the Federal government for allocation of duties in the field of health has influenced to an appreciable extent the apportionment of authority among State agencies. The State is sovereign within the governmental system of

the United States; therefore, it has inherent police power. It is from this power that authority to engage in health work chiefly originates.

Every State has one particular agency, usually termed the department of health, which is charged with the over-all health program. The fields of operation of State health departments vary tremendously because different degrees of responsibility for specific health activities may be assigned to other agencies of State government. According to a study made by the United States Public Health Service in 1940 (53), separate agencies of State government participating in some form of health activity total 48. In a number of cases, terminology rather than nature of organization represented the primary difference in designation. After those having common characteristics were combined, there remained 16 distinct types of agencies and several miscellaneous branches of State government which were engaged in service having some bearing upon the health of the community. A list of these different types of agencies follows:

Department of health

Department of welfare, social security, emergency relief, general assistance, etc.

Department of agriculture

Department of labor, labor and industry, labor and immigration, etc.

Department of education, public instruction, etc.

Special boards, commissions, or independent offices established specifically for the activity indicated (tuberculosis board or commission, cancer commission, workmen's compensation commission or bureau, industrial accident board, dairy and food commission, hotel commission, livestock sanitary board, water resources board, commission for the blind, crippled children's commission, mental disease commission or department, State toxicologist, State veterinarian, etc.)

Board of control, board of affairs, department of State institutions, etc.

Independent State hospital, independent State laboratory

Department of conservation

State university or college

Department of mines and minerals

Department of engineering, department of public utilities

State experiment station

Independent licensing and examining boards

Department of motor vehicles, department of public safety

Department of civil service and registration, department of registration and education

All types of agencies do not function in all States; neither do they always participate similarly in places where they do operate. A few summary statements will give some insight into a situation on which it is difficult to generalize because of the number of exceptions that are found to any conclusion that is drawn. However, since this pamphlet is designed for quick reference, exhaustive analysis is not contemplated, and an effort will be made to present the general picture rather than to play up exceptions. Participation in health work by a multiplicity of agencies does not necessarily imply that each of them has major responsibility for some particular health program. More often, agencies other than the health department function as contributory bodies responsible for specific segments of the broader programs sponsored by the State health agency. For instance, in all States the health department is officially charged with control of general communicable diseases; yet, through their school systems, the departments of education of a number of States conduct educational programs in communicable disease control. In a few States, this same agency has certain law enforcement powers with respect to acute communicable diseases among school children. Moreover, hospitalization for communicable disease patients is furnished by the State university hospitals of at least a half dozen States. Except for the provision of medical and institutional care, the health department usually assumes leadership and guidance in the operation of any program for which it has some portion of responsibility.

The pattern of administration ranges from regulatory functions only, or advisory service only, to operation of complex direct service units. Greatest divergence is noted in the portion of responsibility borne by the State agency and the portion delegated to local political subdivisions. Practically all States have at least the authority for control of epidemics. Usually State regulatory authority is broader, and in many instances the State delegates its power to local agents for enforcement. In one instance, State assistance is limited to advice, supervision, or promotion. In another, the State agency actively engages in direct service. In still another, the first plan is followed for some activities and the second for others, or the first by some participating agencies and the second by others. Distribution of financial aid from State as well as from Federal sources for approved projects is also a form of State participation now in common use.

Perhaps because of the greater number of activities encompassed, or perhaps because of the influence of Federal grant-in-aid programs, the State health department is more apt to utilize all of the methods enumerated in administration of its complete program than any other type of State agency participating in health work. Regulatory powers are directed especially toward the control of communicable diseases and the improvement of sanitation. Stimulation of more adequate local health service is accomplished through the promotional, advisory, and supervisory functions of the State health department. Thus the State agency furnishes guidance to local health personnel in their operations and tends to establish some stability of service throughout the State.

Health functions of departments of welfare, education, and agriculture may also be administered directly or indirectly through local counterparts of the State agency. In departments of welfare, for example, institutional care of any kind is usually a direct State service. On the other hand, medical care of the needy in home or office is rarely administered directly by the State except for selected groups, such as designated categories of relief clients. Instead, the State agency extends financial aid to local political subdivisions which, in turn, arrange for some sort of direct service. When crippled children's programs fall within the jurisdiction of the welfare department, some of the services furnished are directly State-operated or financed, whereas others are locally administered, but State-subsidized.

In the few States where provision of school health service is a function of the State department of education, activities are directly administered by local school boards, with supervision and financial assistance from the parent body. In States where crippled children's services are assigned to the department of education, rather than to the department of health or welfare, essentially the same split occurs between State-operated and State-aided portions of the program.

TABLE 2.—*Relative frequency with which designated types of State agencies have major responsibility for specified health activities*

Activity	State agency chiefly responsible*														
	Department of health	Department of welfare	Department of agriculture	Department of labor	Department of education	Special board or commission	Department of institutions or board of control	Independent State hospital	Department of conservation	State university or college	Department of engineering or public utilities	Independent licensing or examining boards	Department of registration and education or civil service	Other departments or offices of State government	No State program in operation
Public health and preventive services:															
Acute communicable disease control	48														
Tuberculosis control—(field services)	44	1				2	1								
Venereal disease control	48														
Malaria and mosquito control[1]	23														
Sanitation of water supplies	47														25
Sanitation of sewerage systems	44										1				
Sanitation of bathing places	46					3								1	
Sanitation of hotels and camps	35		5	2		2			1	1					2
Shellfish sanitation[1]	19		1						1						2
Milk sanitation	34		11			3									27
General food sanitation	25		17			3			1	1				1	
Purity, potency, and labeling of foods and drugs.	25		18			4			1						
Industrial health services	37			2											9
Plumbing control	14					4							1		29
Housing	4			4		8								5	27
Rodent control and control of garbage collection and disposal.	25														23
Maternity-child health activities	48														
School health services	43				4										1
Public health nursing	48														
Dental services	37				1		1								9
Health education	48														
Nutrition	42														6
Statistics and vital records	47													1	

See footnotes at end of table.

TABLE 2.—*Relative frequency with which designated types of State agencies have major responsibility for specified health activities*—Continued

Activity	State agency chiefly responsible*														
	Department of health	Department of welfare	Department of agriculture	Department of labor	Department of education	Special board or commission	Department of institutions or board of control	Independent State hospital	Department of conservation	State university or college	Department of engineering or public utilities	Independent licensing or examining boards	Department of registration and education or civil service	Other departments or offices of State government	No State program in operation
Public health and preventive services: (Cont.)															
Laboratory service	48														
Medical and custodial care:															
General illness[2]		24					1	1		5					17
Tuberculosis	16	8				8	13							1	2
Mental disorders		12				3	24	9							
Cancer	10					3		1		8					26
Crippled children	22	12			5	6	1			2					
Workmen's compensation				14		33									1
Licensure:															
Members of the healing arts—															
Physicians	9				2							32	5		
Osteopaths	6				2							33	5		2
Chiropractors	5				1							34	5		3
Optometrists	5				2							36	5		
Nurses	3				4							36	5		
Dentists	3				2							38	5		
Dental hygienists	2				2							19	2		23
Pharmacists	2				2							40	4		
Others	6				2							20	5		15
Embalmers and/or funeral directors	8											35	5		
Midwives	18				1							8	2		19
Hospitals and/or other health facilities	28	6					1								13

*This tabulation is based primarily on information reported to the Public Health Service by authorities of State governments in 1940 in connection with the study, "Distribution of Health Services in the Structure of State Government" (53). However, more recent data have been substituted whenever available.

[1]Of sectional concern only.

[2]For indigents or categorical relief groups only. There are no State programs of general medical care for the public-at-large.

Primary functions of the State department of agriculture with respect to milk and food sanitation may be described as regulatory; secondary functions, as direct service (laboratory determinations and inspections of dairy herds and farms, pasteurization plants, food stocks, and food-handling establishments); and tertiary functions, as indirect service (advice to local authorities concerning conditions requiring local action). Contributions to the health of the general public by most other agencies of State government are in the form of direct rather than indirect service.

Marked variability occurs among the States in assignment of responsibility for operation of the many activities that make up a total health program. Therefore, State organizational patterns for health work can be traced better by indicating the frequency with which a particular type of agency is charged with a specific health function than by attempting to enumerate for the entire country the different combinations of health responsibility for any type of State agency. Table 2 has been constructed to show in a general way the relative frequency with which designated types of State agencies are given primary responsibility for performance of specific health functions. For this chart, subordinate contributions of collaborating agencies have not been considered; consequently, the number of State agencies represented is appreciably smaller than it would be if participation in each aspect of a given program were included.

Functions significant to health have been grouped under four headings, several of which are subdivided. Classification headings are:

Public health and preventive services
Medical and custodial care
Workmen's compensation
Professional licensure

Public Health and Preventive Services

Only one-fourth of the twenty-four public health and preventive services listed are invariably lodged in State health departments. Approximately the same number are usually found there. When activities of the latter group are placed elsewhere, usually they are distributed in this manner: registration and preservation of vital statistics are delegated to the office of Secretary of State; school health services to the department of education; field services for tuberculosis control are an extension of sanatorium functions, the institutions being administered either by the department of welfare, a special tuberculosis board or commission, or a department of institutions; and sanitation of water supplies and sewerage systems to a department of engineering, department of public utilities,

or sanitary water board. Occasionally, the department of agriculture rather than the department of health is responsible for sanitation of hotels and camps, and sometimes authority for such control is centered in a department of conservation, department of labor, special board or commission, or State university. While industrial health services are performed by the health departments of more than three-fourths of the States, they are a function of a few departments of labor and in some instances no State agency operates an industrial hygiene program as a distinct entity. Dental services, usually provided by the health department, are largely restricted to children. In a number of States, even limited dental programs have not been inaugurated on a State-wide basis.

Milk sanitation, general food sanitation, and control of foods and drugs for purity and potency are required of State health departments frequently (by more than half but less than three-fourths of the States). Fairly often, departments of agriculture are charged with milk sanitation and control of foods and drugs; occasionally special boards or commissions have been established for handling these activities; and infrequently these duties are assigned to the department of conservation. Exceptions to this general pattern may be determined from table 2. Since rodent control and control of garbage collection and disposal are usually localized, these programs frequently are not operated by State agencies. When State health departments do participate, they exercise a general supervision rather than an intimate control, and place special emphasis on recommended standards of practice. Regulation of plumbing installations is not a State-wide function in more than half of the States. When it is, authority is primarily exercised through establishment of standards, approval of plans, or issuance of permits and is delegated to the health department more often than to other types of agencies. Occasionally, there are special boards or commissions operating for this purpose. Because of geographic characteristics which minimize these particular problems in a number of States, there is frequently no State activity for malaria and mosquito control or for shellfish sanitation.

The need for low-rent housing that will provide the minimum essentials for decent and healthful living has been recognized. Forty States have enacted legislation authorizing the creation of local housing authorities to construct and operate low-rent housing in cooperation with the Federal Government (54). Eleven of these States have either established a special housing authority as an administrative branch of their State government or have designated a division of some existing agency in State government to be officially responsible for an organized housing program. Ten additional States, usually through their health department or department of labor, informally engage in miscellaneous activities for improvement of existing housing.

Medical and Custodial Care

State arrangements for medical and custodial care depend largely upon the condition or illness involved. All States assume responsibility for care of the mentally ill, but only rarely is such care a health department function. Agencies administering State mental hospitals are more likely to be departments of welfare, departments of institutions, or boards of control. Occasionally, State mental hospitals operate independently of any central administrative body. On the other hand, hospitalization of the tuberculous and of crippled children are often health department functions. In a number of States, the same agency operating the mental hospitals also administers the medical care program for crippled children and hospitalizes the tuberculous. Approximately half of the States have no organized program for cancer treatment. In the other half, health departments and State university hospitals have assumed leadership in providing care for cancer patients. Medical care for general illnesses is not available for the public-at-large in any State. However, about half of the States furnish some measure of medical care for designated relief groups. Such provisions range from fairly comprehensive programs for all indigents to extremely limited services for recipients of old age assistance or of aid for dependent children. A few States operate a system of charity hospitals, and several more supply financial aid to voluntary hospitals accepting patients who are unable to pay the regular fee.

Workmen's Disability Compensation

Some sort of official program for workmen's compensation for disability is operated in all but one State. In about half the States, compensation covers industrial accidents only. In the other half, selected occupational illnesses as well as accidents are compensable. The department of labor administers workmen's compensation activities in nearly one-third of the States. In the others, an industrial commission, industrial accident board, or workmen's compensation commission is responsible. Besides approving settlements, adjudicating disagreements, and, in some instances, awarding benefits, a few States have developed uniform plans for providing medical and hospital service to their injured employees.

Professional Licensure

Licensure of physicians, dentists, other members of the healing arts, nurses, midwives, and embalmers and funeral directors is a responsibility of specialized licensing and examining boards more often than it is a function of an administrative agency of State government. Osteopaths, chiropractors, dental hygienists, and midwives are not recognized by all States as licensed practitioners. There is a marked trend toward place-

ment of hospital licensure under the jurisdiction of State health departments.

Cost of State Health Services

Inasmuch as current data on expenditures of the various agencies of State government for each of the health functions listed could be obtained only by personal visits to the many agencies involved, cost information has been omitted from this elementary guide. However, those who wish may find expenditure figures for the year 1940 given in the "Distribution of Health Services in the Structure of State Government" (53). Summary figures on expenditures are repeated as tables 1 and 2 of appendix A. Some health programs have expanded appreciably since that time; yet, on the whole, the figures there presented are indicative of the relative magnitude of the numerous activities making up the State's total fabric for health protection and of the contribution of each type of State agency.

LOCAL HEALTH ORGANIZATION

General Characteristics of Local Government

For an understanding of the several patterns of local health organization, it is necessary to have some insight into the complexity and diversity of the structure of local governmental jurisdictions. While the State is a sovereign unit in the governmental system of the United States, it has delegated to counties, municipalities, townships, and other local governmental units certain functions in the discharge of which the local political subdivisions may be quite autonomous. The authority of local governmental units may be defined in the State constitution, acts of the legislature, or charters. Local ordinances and regulations serve to implement this basic authority. Throughout the continental United States, there are approximately 38,000 units of local government having "a legally authorized organization and governing body, a separate legal identity, the power to provide certain public or governmental services, and a substantial degree of autonomy including legal and actual power to raise at least a part of its own revenue" (55). These local units constitute divisions of the Nation's States for general governmental purposes and do not include over 125,000 school and other special-purpose districts which cut across and overlap the 38,000-odd multifunctional units.

In order of area, the county is the major subdivision of a State. There are, in all, 3,070 counties[4] in the United States. The remaining 35,000

[4] Of the 3,070 actual counties in the United States, 9 (San Francisco, Calif.; Denver, Colo.; New Orleans, La.; Philadelphia, Pa.; and the 5 counties making the city of New York) are conterminous with cities. In addition, 24 cities in Virginia; Baltimore, Md.; and St. Louis, Mo.; function independently of any county but are not included in the count. The District of Columbia and Yellowstone National Park are excluded, likewise, because they do not have regular county status.

units of local government are minor subdivisions of the counties, frequently referred to as minor civil divisions. These, in turn, are of two classes: 1, Special incorporations in urban or partly urban places for the general purposes of local government and services, and 2, subdivisions of the county in rural areas for local purposes. Units of the latter class form the "town" or "township" system of government and exist in 22 States, notably the New England section, a few Middle Atlantic States, and part of the midwestern States. In New England and in the vicinity of large cities in other States, many governmental units of this class are highly urbanized and not easily distinguished from the urban incorporated places. Incorporated places, of which there are over 16,000, may be designated as cities, towns, villages, or boroughs. The larger ones are usually known as cities, while smaller units of this class are most commonly called towns, villages, or boroughs. Confusion results from indiscriminate use of the term "town"—meaning village in some States, and unincorporated subdivisions of a county in others.

Counties as organized units of government have diversified functions. While localized affairs are their primary concern, they also function as agents of the State government for the enforcement of laws enacted by the State and for administration of public services authorized by the State. The 19,000 townships and 16,000 incorporated places in the United States have a wide variety of governmental authority. In some, powers of county subdivisions are sweeping in character; in others, they are exceedingly limited. On the other hand, much of the authority with which many counties are vested is not exercised and a great number of the duties with which they are charged are not actually performed since, in practice, it proves more economical to operate on a county basis than to partition public functions further. Nevertheless, the usual county subdivisions continue to operate in a minor sense as separate governmental entities even though such operation may be expensive and ineffective.

Public Health and Preventive Services

Local health organization has been modeled closely after general local governmental organization and reflects many of the same characteristics. While obviously it is impossible to summate all variations in the performance of local governmental organizations and authorities, it might be said that the more effective local health organizations are to be found in cities and counties of considerable population and economic resources. Exceptions to this generalization may be taken in those areas where the State has compensated for local lacks through grants of supplemental aid. The degree of realism and success with which community responsibility for the health of its residents is met is determined by the number of trained full-time health workers the community can afford or is willing

to employ. Many of the smaller and poorer counties find it impossible to support an adequate health service even with generous assistance from State and other outside sources. Consequently, combination of jurisdictions and pooling of resources for maintenance of an effectively operating health department has become an increasingly popular feature of local health organization. More than half of the States now have enacted permissive legislation, which specifies that cities, towns, villages, boroughs, townships, or minor civil divisions of other types may consolidate to form county health units. Nearly as many States have statutory authorization for neighboring counties to join forces as a district in order to support a full-time health service, which no one of them could maintain independently. (See appendix B.) A contained city wishing to preserve its identity, yet recognizing the advantages of cooperation with the rest of the county in the operation of a single health unit, may enter into what is known as a city-county agreement, an arrangement which has been treated in detail by Mountin and Norman (56). By such consolidation it is possible for the jurisdiction established to support a health department consisting of a corps of health specialists (physicians, nurses, dentists, sanitation personnel, health educators, nutritionists, analysts, and other necessary technical and clerical personnel), who will perform all health functions for the component political subdivisions. Most States now have machinery which permits them to strengthen local health services through merging their resources. While the number of local health authorities which operate independently of each other is still excessive, a fair amount of consolidation is being accomplished. According to current estimate (57), more than 18,000 local governmental jurisdictions, apart from school districts, have delegated responsibility for some form of health service to groups.

Because of rather haphazard arrangements for health services through official health agencies in many places, other local governmental agencies interested in special phases of health work have often assumed responsibility for their individual interests. For instance, boards of education may be concerned with the school health problems, departments of public works with construction and maintenance of sanitation facilities, and welfare agencies with provision of medical and hospital care. Likewise, a varying number of voluntary agencies contribute to the total health resources of any given community.

A thoroughly accurate enumeration of personnel employed throughout the United States in providing local public health services is difficult to obtain. Various estimates have been made, but the most complete count appears to have been obtained by Emerson and Luginbuhl (57) in a recent study financed by the Commonwealth Fund. The results are shown here as table 3. This enumeration includes personnel under the

TABLE 3.—*Personnel employed for local health services*[1] *in 1942* (57)

Class of personnel	Number of personnel of each class employed in 1942		
	Total	Full-time	Part-time
All classes	40,782	29,201	11,581
Health officers	5,519	1,202	4,317
Other medical administrators	1,065	1,065	
Clinicians, part-time	4,656		4,656
Public health nurses	14,274	13,742	532
Sanitary personnel:			
Professionally trained, including engineers and veterinarians	577	539	38
Sanitarians, not professionally trained, including inspectors of various types	4,927	4,677	250
Clerical and secretarial workers, including those with statistical training	5,279	4,830	449
Laboratory workers:			
Professional	321	290	31
Technical	720	615	105
Unskilled	309	293	16
Dentists	1,266	307	959
Dental hygienists	372	318	54
Health educators	44	44	
Others	1,453	1,279	174

[1] In addition to health personnel of official agencies under the direction of both full- and part-time health officers, this enumeration includes nurses, physicians, dentists, and dental hygienists employed by local school boards.

direction of both full- and part-time health officers; it also includes nurses, physicians, dentists, and dental hygienists employed by local school boards, where such duties are so delegated.

Progress in local health organization in any area is measured in terms of the extent to which it is covered by organized health services under the direction of a full-time health officer. In fact, full-time leadership is regarded as being so important that Federal financial grants for general health purposes are extended only to health jurisdictions so administered. Size and degree of specialization of the health department staff required depend, of course, upon size of the population unit to be served. The proportion of population of the entire United States served by different types of local health organization is shown in table 4, another tabulation appearing in the Emerson-Luginbuhl study. Here, the population served by full-time local health service includes residents of cities, single counties, and groups of counties (local health districts) employing a full-time professional health officer for administration of the operating unit. Persons receiving part-time local health service are those living in localities which employ a health officer serving on a part-time basis only. To compensate for the absence of local full-time health units, a number of State health agencies have organized districts of several

political subdivisions each for more effective administration of State health services to at least a part of the population not otherwise provided for. For a small proportion of the population the State health district system supplements part-time local service; for a larger percentage, the State provides practically the only health service available in areas so covered.

TABLE 4.—*Population of continental United States served by designated type of local health service (57)*

Type of service	Population served	
	Total	Percent
All types	131,669,300	100.0
Full-time local health service	[1]87,411,000	[1]66.4
Other than full-time local health service:		
Part-time local health service	20,011,000	15.2
State district service only	10,868,300	8.2
Both part-time local and State district health service	4,152,400	[1]3.2
No local health service reported	9,226,600	7.0

[1] If one assumes that the 3,037,700 persons served through the New York State health districts also belong in this category, this percentage would be 68.7 and the category of combined part-time local health service and State district service would be 0.9 percent.

Geographic differences in schemes of health organization are very interesting and are influenced markedly by the pattern for general local government. As shown in figure 9, the city, town, or municipality is the type of local health jurisdiction encountered most frequently in the northeastern area. Single-county health departments and multicounty health units previously described have flourished in the southeastern and south central portions of the country. Health organizations of the latter class are usually referred to as local health districts. Worthy of particular note is the portion of each geographic area for which local initiative has failed to make any provision for full-time health service. When all forms of local health organization are combined, the fraction of the population that remains uncovered by the protection of full-time health service is larger for the north central States (47 percent) than for any other group, while the northeastern section has only a slightly better record. Only in the southeastern region are more than four-fifths of the inhabitants served by a health department under the direction of a full-time health officer.

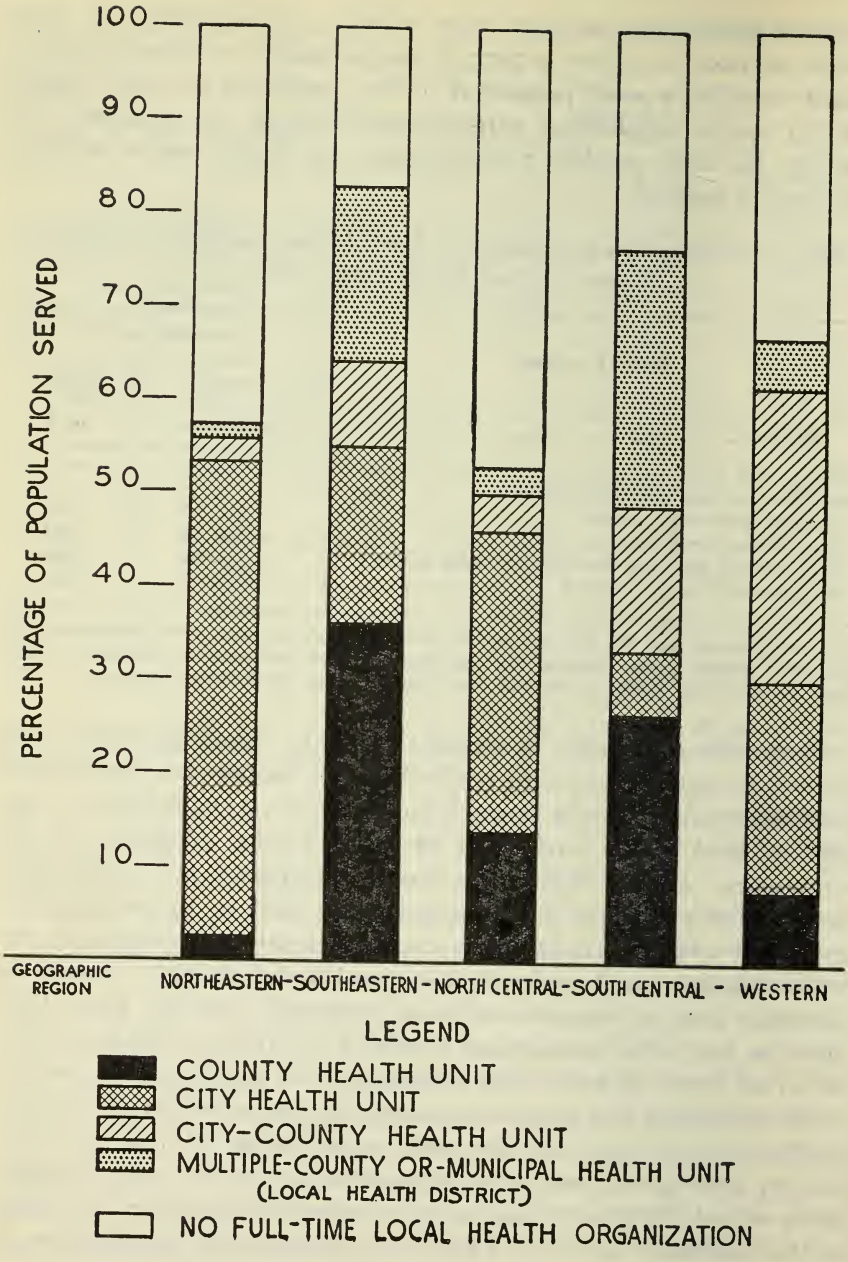


FIGURE 9—Proportion of the total population covered by full-time local health organization of specified type in each of five broad geographic regions.

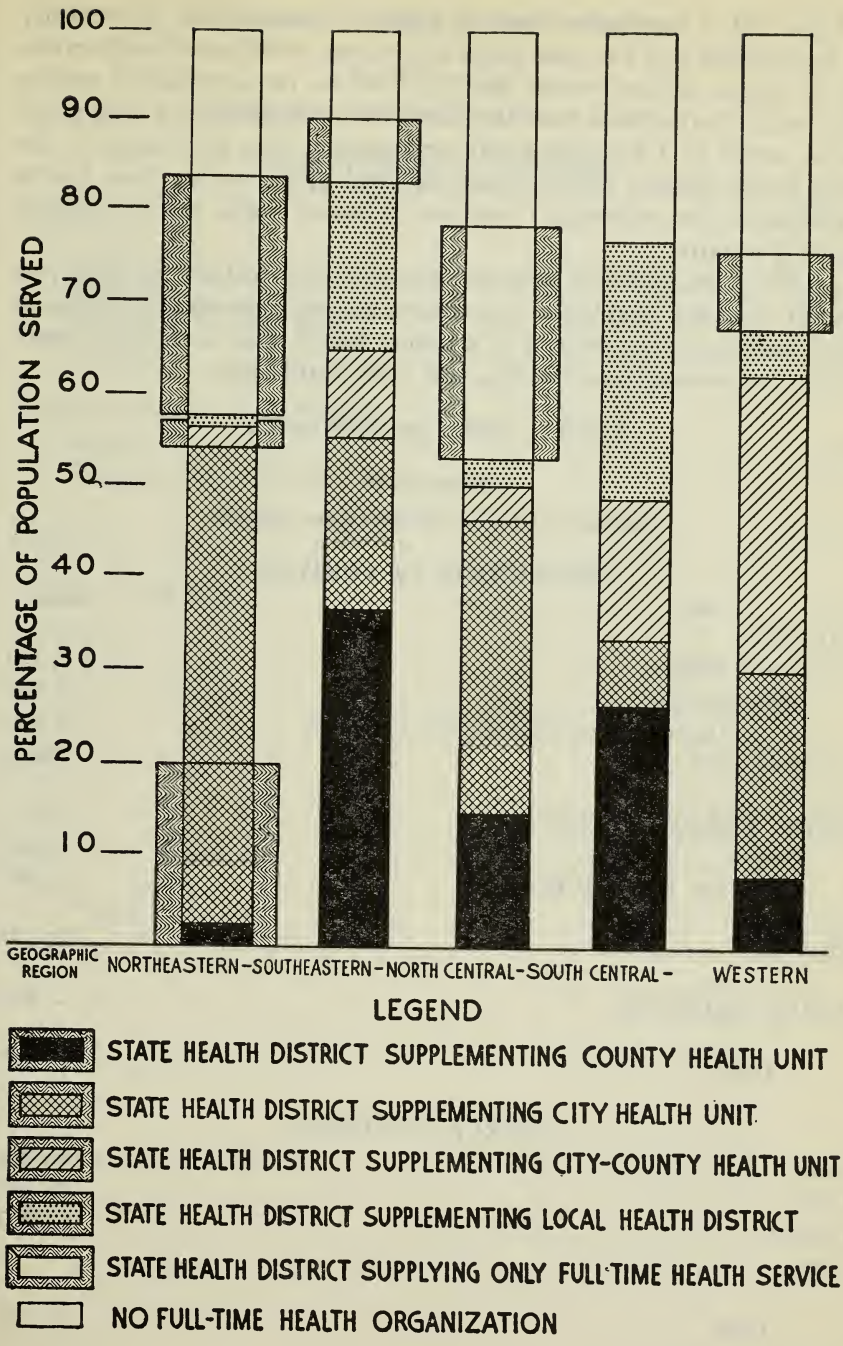


FIGURE 10—Supplementation of local full-time health organization by State health districts in each of five broad geographic regions.

Figure 10, a companion chart to figure 9, demonstrates the tendency to equalization that has come about in coverage of full-time health service by the device of State health districts. Even so, the southeastern section still leads all other areas from the standpoint of proportion of total population served by a full-time health organization. In a few instances, the State health district system is superimposed upon existing local health organization, but ordinarily it operates in lieu of, rather than in addition to, local activity.

At this point, there are presented several sample budgets for fiscal year 1949 of organized local health departments serving communities of different sizes. Represented are budgets of a county health unit, a multiple-county health unit serving three counties, and a city health unit.

TABLE 5.—*Budget for health services*

County Unit

Estimated Civilian Population—46,600

DESCRIPTION OF PURPOSE

Item	*Amount*
SALARIES	
Health Officer	$ 6, 100
Sanitarians (4)	11, 000
Public Health Nurses (5)	12, 600
Clerks (2)	3, 600
OTHER PERSONAL SERVICES	
Wages	200
Clinicians' Fees (MCH & VD)	1, 900
TRAVEL	10, 000
OTHER EXPENSES	2, 400
Total	47, 800

SOURCE OF FUNDS

State	14, 900
Local	16, 100
Federal	16, 800
Other	—
Total	47, 800

TABLE 6.—*Budget for health services*

Tri-County Unit
Estimated Civilian Population—75,600

DESCRIPTION OF PURPOSE

Item	*Amount*
SALARIES	
Health Officer	$ 6, 500
Sanitarians (3)	8, 800
Public Health Nurses (8)	19, 400
Clerks (4)	6, 800
OTHER PERSONAL SERVICES	
Wages	1, 400
Clinicians' Fees (MCH & VD)	4, 700
TRAVEL	10, 400
OTHER EXPENSES	3, 000
Total	61, 000

SOURCE OF FUNDS

State	25, 400
Local	14, 200
Federal	21, 400
Other	—
Total	61, 000

TABLE 7.—*Budget for health services*

City Unit

Estimated Civilian Population—306,500

DESCRIPTION OF PURPOSE

Item	*Amount*
SALARIES	
Director of Public Health	$ 8, 100
Public Health Physicians	
Venereal Disease Control Officer	6, 700
Tuberculosis Control Officer	6, 700
Physicians (2)	10, 500
Physicians (24 PT)	27, 800
Pediatrician (PT)	1, 300
Sanitation Personnel	
Public Health Engineer	7, 600
Sanitary Engineers (6)	24, 100
Senior Sanitarians (12)	37, 800
Junior Sanitarians (25)	60, 200
Food Inspector	4, 900
Veterinarian	3, 700
Nursing Personnel	
Public Health Nurse Supervisors (3)	8, 900
Public Health Nurses (41)	89, 400
Graduate Nurses (16)	33, 400
Dental Personnel	
Dentist	4, 900
Dentist (PT)	600
Dental Hygienist	2, 500
Laboratory Personnel	
Senior Bacteriologist	4, 400
Junior Bacteriologist	2, 900
Serologist	2, 600
Laboratory Technicians (3)	7, 500

TABLE 7.—*Budget for health services*—Continued

Item	*Amount*
SALARIES—Continued	
Clerical Personnel	
Clerk-Stenographers (6)	$ 12, 900
Clerks (12)	20, 900
Service and Custodial Personnel (11)	24, 500
Other Personnel	
Health Educator	3, 200
Typhus Control Officer	3, 800
X-ray Technicians (3)	6, 800
Welfare Investigator	2, 200
Accountant	3, 600
OTHER PERSONAL SERVICES	
Wages	52, 800
TRAVEL	24, 500
OTHER EXPENSES	84, 900
Total	596, 600
SOURCE OF FUNDS	
State	26, 700
Local	524, 700
Federal	45, 200
Other	—
Total	596, 600

The picture of local health organization would not be complete without consideration of the program content of local health departments of various types. As aptly stated by Mustard (58), " * * * the vast majority of routine health service received by the people of the United States is delivered by local agencies. The Federal Government may subsidize and indirectly shape local health departments, the State health department may determine major policies for local agencies, set standards, promulgate regulations, and even directly supervise them, but the final determining factor in the effectiveness of a public health program rests with the workers in the locality where the problems are occurring."

Provision of public health nursing service is perhaps the most widespread function of local health agencies. Operation of different kinds of clinic facilities is another outstanding service. Data in the files of the Public Health Service from several selected States show that such clinics may be established for supervision of maternity patients and young children; performance of immunizations against smallpox, diphtheria, and other communicable diseases; diagnosis of tuberculosis; collapse therapy of nonsanatorium patients; mental hygiene; diagnosis and/or treatment of cancer; and, occasionally, general diagnosis and treatment. All types of clinics are not operated with equal frequency. Immunization, venereal disease, well-child, and diagnostic tuberculosis clinics are usually found among the local health department's roster of activities, while collapse therapy, mental hygiene, cancer, and polyclinics are noted much less extensively.

Other health services frequently available through local health departments are supervision and sanitary control of water supplies, sewage disposal facilities, milk production and distribution, and food-handling establishments; diagnostic laboratory services; school health services, including physical inspection or examination and health instruction; nutrition services; and general health education. Collection and analysis of vital statistics is also a function of some local health departments.

Some idea of the completeness of different kinds of local health services may be gained from the most recent Evaluation Schedules (59) prepared by 243 local health jurisdictions and submitted to the Committee on Administrative Practice of the American Public Health Association for grading and inclusion in the new edition of Health Practice Indices (60). While it is not claimed that the participating health departments are an entirely representative group, various types of health organization serving communities ranging in population from 8,000 to 1,957,500 and representing 32 different States are included. The following half dozen indices from the array developed by the Committee on Administrative Practice have been chosen for presentation in this article to reflect extent of local health services:

Percentage of cases of typhoid and paratyphoid fever investigated for which sources were found

Percentage of contacts to newly found cases of tuberculosis that were examined

Percentage of reported contacts to early and early-latent cases of syphilis that were examined

Percentage of children under 5 years of age who were vaccinated against smallpox

Percentage of children under 2 years of age who were immunized against diphtheria

Percentage of restaurants, lunch counters, and taverns having approved sanitation and food-handling facilities

Performance of the health jurisdiction occupying the median position with respect to each selected index of community health practice is shown herewith. First, the median has been determined for the entire group of reporting communities, and, secondly, the reporting jurisdictions have been classified according to 5 broad geographic regions, with the median performance computed for each area. Since all 243 jurisdictions did not answer every question in the schedule, the number supplying positive information on each of the items listed is recorded in table 8.

The marked variations which characterize local health practices are illustrated just as emphatically in this table as are differences in local health organization in figures 9 and 10. Each of the indices selected is a recommended, elementary procedure for protection of community health; yet, of the particular group for whom a designated service was intended, the proportion reached ranges from 17.0 percent to 72.3 percent in the median health jurisdiction of the entire reporting group. Even a wider difference occurs among jurisdictions of each separate geographic section of the country. Moreover, for a single criterion—such as restaurants, lunch counters, and taverns with approved sanitation and food-handling facilities, or reported contacts of early and early-latent cases of syphilis that were examined—there is extreme variability with respect to performance in the several geographic areas.

Medical and Custodial Care

Whereas State provisions for medical and hospital care are focused primarily upon mental disorders and secondarily upon tuberculosis, with relatively little attention to general illnesses, local governments have been much more active in the operation of general and allied special hospitals. Counties, cities, and counties and cities combined operate about 600 hospitals with a total capacity of more than 100,000 beds for care of patients with general illnesses (61). Three times as many tuberculosis hospitals are maintained by units of local government as by State govern-

TABLE 8.—*Completeness of designated health services in a selected group of health jurisdictions as reflected by reported performance in the median community of each geographic area and of all areas*[1]

Health Index	Number of reporting jurisdictions and percentage of specified group reached by each service in the median jurisdiction of each geographic area											
	All Areas		Northeastern		Southeastern		North Central		South Central		Western	
	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction	Number reporting jurisdictions	Percent of completeness of service reported by median jurisdiction
Cases of typhoid and paratyphoid fever investigated for which sources were found.	166	42.9	7	59.2	11	73.9	57	50.0	80	31.4	11	59.7
Contacts to newly found cases of tuberculosis that were examined.	188	71.1	9	75.9	8	76.3	78	75.4	83	63.0	10	79.6
Reported contacts to early and early-latent cases of syphilis that were examined.	159	70.0	7	100.0	10	63.0	49	83.3	84	64.3	9	55.6
Children under 5 years of age who were vaccinated against smallpox.	181	17.0	7	29.7	10	9.9	73	22.5	77	8.8	14	21.4
Children under 2 years of age who were immunized against diphtheria.	189	17.1	10	36.3	11	27.8	66	12.1	89	17.6	13	15.1
Restaurants, lunch counters, and taverns having approved sanitation and food-handling facilities.	180	72.3	7	97.8	9	99.3	64	51.8	90	69.2	10	75.8

[1] From basic material in files of the American Public Health Association.

ment; however, the combined bed capacity of city and county tuberculosis institutions exceeds that of State tuberculosis sanatoria by only about 15,000. There are few city or county mental hospitals; altogether, they have less than one-tenth the number of beds found in State institutions for mental patients. Tables comparing the hospital facilities sponsored by different types of agencies are presented in appendix C. Local governmental hospitals of all types are sometimes administered by health departments, but more often by departments of welfare, boards of county commissioners, or other boards named especially for that purpose.

Home and office care of the medically indigent is usually a feature of the broader public assistance programs of local welfare departments. Only occasionally is it a function of the local health department. In some instances a city or county physician is employed on a full-time basis for this service. Frequently, private physicians of the community serve the public assistance clients and others whose care is financed from tax sources at an adjusted fee rate.

VOLUNTARY HEALTH AGENCIES

Public Health and Preventive Services

Voluntary health agencies may supplement the local official health agency in maintenance of maternity, pediatric, mental hygiene, and cancer clinics. These agencies are more active in urban communities than in rural areas. They have reached a particularly high point of development in the New England portion of the United States where a relatively large proportion of all public health personnel are employed by voluntary health agencies, which also sponsor a great number of health facilities and services.

More than 20,000 separate agencies, pioneering groups of citizens whose work is supported largely from private sources, contribute to the total voluntary health effort. In addition to providing health services which supplement those from official sources, voluntary health agencies engage in health education activities and work for the advancement of research and the enactment of legislation for improvement of health. Voluntary agencies are more free to engage in experimental pursuits than are tax-supported organizations; consequently, exploration of new fields of health activity is one of their primary functions. Frequently, by practical demonstration of new and improved methods, the voluntary agencies pave the way for broader and more effective health programs by official agencies.

Gunn and Platt (62) have recently classified voluntary health agencies in three broad groups: Those concerned with certain specific diseases — notably tuberculosis, syphilis, gonorrhea, cancer, poliomyelitis, and diabetes; those interested in the safeguarding of specific organs or

functions — as the eyes, ears, teeth, skeleton, and heart; and those promoting the health of special groups or of society — maternal and child hygiene, planned parenthood, mental hygiene, and hazards to life and limb. Most of the 20,000-odd voluntary health agencies operate at the city or county level, but nearly 300 have a State-wide field of activity. Organizations of 16 are national in scope. Exclusive of the American Red Cross, which embraces many interests besides health improvement, nearly $50,000,000 is expended annually throughout the country by the nationally sponsored voluntary agencies devoted to public health work.

Medical and Custodial Care

Voluntary group prepayment plans for hospital service and medical service are a growing institution in the United States. Hospital service plans, organized on a nonprofit basis are further developed than medical service plans. Reed and Vaughan have collected an interesting body of data concerning medical and hospital plans. Some of their findings (63) (64) and reports of other related studies (65) (66) are particularly pertinent to this discussion of over-all provisions for health service in the United States, and are included here.

According to the most recent information available, there are in operation in the continental United States 80 hospital service plans with an enrollment of nearly 20,000,000 persons, as compared with 30 medical plans having a membership of 2,200,000. All but 5 States now have some sort of voluntary hospital service plan in operation. Furthermore, the entire area of 33 States is covered either by a single plan operating on a State-wide basis, by two competing State-wide plans (1 State), or by several local plans which together cover the whole State. For the most part there is enabling legislation for organization of hospital insurance plans. Such statutes usually exempt the plans from taxation, call for their supervision by the State insurance department, and apply to local as well as State systems. New plans for both medical and hospital service are being organized continuously, and enrollment under existing plans is increasing.

Benefits of the various hospital plans vary. Half of them provide semiprivate room accommodations; another large group offers a choice of semiprivate or ward beds; a few provide ward service only; and the remainder offer various combinations. Members are not restricted to the type of facilities covered by their prepayment contract if they pay the difference between the value of accommodations allowed and the regular rate charged for the room selected. Though there are variations, most plans offer 21 days of complete service, with a 50-percent discount for the next 90 days. All plans cover room and board, use of the operating and delivery rooms, general nursing service, and—in varying degrees

of completeness—laboratory service, drugs, dressings, casts, and splints. Some include anesthesia, X-ray, metabolism tests, electrocardiogram, physical therapy, and oxygen. Care for mental disorders and tuberculosis is usually excluded from coverage.

A subscriber to a hospital service plan may obtain membership for himself alone, for himself and his wife, or for his entire family. Typical subscription rates on a monthly basis are $0.75 for a single person, $1.50 for husband and wife, and $2.00 for a family.

Medical service plans are sponsored by State or local medical societies and usually cover physicians' fees for surgical and obstetrical service in hospitals. However, when the hospital plan does not cover X-ray, laboratory, and anesthesia, these services are usually included in the medical plan. Subscription rates for medical service contracts are about the same as for membership in a hospital service plan.

The relationship between medical and hospital service plans runs the gamut from no coordination whatever to one organization with a single board of directors offering both hospital and medical service. Between these extremes are two other characteristic relationships. Under the one there are two separate corporations with separate executive directors but joint control of certain administrative functions such as enrollment, billing, and record keeping. Under the other, there are separate corporations and separate boards of directors, but a single executive director with one administrative staff. Here the medical plan has no employees of its own. Only the policy making is the work of two separate bodies, for the medical plan is administered by the hospital service plan.

During the past decade, commercial insurance companies, particularly large life insurance companies and casualty companies, have greatly extended their coverage in the provision of indemnity insurance for hospital care and surgical and obstetrical service. Reimbursement of expenses for home and office care is a recent and largely experimental undertaking by insurance companies. Approximately 8,500,000 persons are carried by commercial insurance companies for hospital care, 5,500,000 for physicians' services to surgical and obstetrical patients, and 150,000 have policies covering home and office care. Such illness insurance is sold on both a group and individual basis.

Of longer standing are the industrial medical service plans. More than a quarter of a century ago a few railroad, mining, and manufacturing companies found it desirable to establish some form of medical service to compensate for the absence of such care under other auspices. Now, more than 100 industrial companies have some organized scheme for furnishing medical care to their employees, and, quite often, to their employees' dependents. Industrial medical service plans usually provide hospitalization and physician's care in the office, home, and hospital. Generally, such plans are financed largely by the employees through

periodic deductions from their pay, with some contribution from the employer. However, in a few instances, the entire cost of complete medical care to all employees and their dependents is borne by the company. It is estimated that about 2,000,000 people are served by such plans for hospitalization, with perhaps a slightly smaller number for other types of service.

Nongovernmental hospital facilities for general and allied special conditions dominate those maintained by either State or local governments, with respect both to count of institutions and to number of beds. There are two classes of nongovernmental hospitals, nonprofit and proprietary. Together, they number nearly 4,000 with a total bed capacity of more than 338,000. Table 1 of appendix C emphasizes the important place of nongovernmental agencies in the operation of all general and allied special hospitals. In size, nongovernmental hospitals run somewhat smaller than those operated by governmental bodies (table 2, appendix C), but the relatively large number of nongovernmental institutions among general hospitals places them in the foremost position among this group.

A recent survey of civilian hospitals (67) reveals that nongovernmental general and related hospitals exceed those of any governmental jurisdiction not only in total plant valuation but also in the average valuation per bed, average annual purchase of equipment and supplies per bed, average payroll per bed, and average number of personnel employed per 100 beds. In this study, assets and operating costs were not broken down by control for mental and tuberculosis hospitals. However, comparison of totals for civilian hospitals of all medical types with those for general and allied special conditions only shows that mental and tuberculosis hospitals are less expensive to operate than those of the "general" classification (table 6, appendix C.) Nongovernmental hospitals are financed primarily through fees collected from patients, though endowments and aid from tax sources account for nearly one-fourth of their income (68). There is marked variation in the geographic distribution of hospital facilities as demonstrated in tables 3, 4, and 5 of appendix C. Characteristics which favor hospital establishment are: a large total population; concentration of population in urban areas; high per capita spendable money income; and presence of a large city within the same county or close proximity to a large city in a neighboring county. Rural areas having a low economic status are poorly supplied with hospital facilities, particularly those of nongovernmental control.

Although the number of nongovernmental hospitals for nervous and mental disorders and for tuberculosis is fairly high, such institutions are apt to be small in size, and the total bed capacity is only a minor fraction of that supplied by governmental institutions of like medical types, as noted in tables 1 and 2 of appendix C.

PROFESSIONAL EDUCATION

While it cannot be considered a health service in a direct sense, professional education, both basic and postgraduate, determines the caliber of personnel employed for the performance of health service. Educational facilities, particularly medical, dental, and engineering schools, play an important part in providing the fundamental training for public health workers. Hospitals, too, though primarily service institutions, occupy a prominent educational position for nurses and physicians. Training in public health as a specialty is acquired as postgraduate study; however, the kind of instruction in preventive medicine and public health that physicians receive in medical school and the kind of fundamental training that nurses receive in their elementary courses form an important background. Although some of these schools and hospitals are tax-supported, more are privately maintained for most of the professions operating in the health field. This is especially true with respect to schools of nursing. Table 1 of appendix D carries a complete count of schools in the United States which offer accredited basic courses in the several health professions and shows the relative position of each level of government and of nongovernmental agencies with respect to their operation.

Except in the instance of nursing, accreditation of these schools is a responsibility of educational committees of the respective professional organizations. For instance, medical schools are approved by the Council on Medical Education and Hospitals of the American Medical Association; dental schools, by the Council on Dental Education of the American Dental Association; and engineering schools, by the Engineering Council for Professional Development. Nursing schools, on the other hand, are approved by the respective State Boards of Nurse Examiners, agencies established by State law. Upon graduation, members of each professional category are required to pass an examination before the State examining board covering their particular profession before being permitted to practice.

During the war period, the nurse education program of the United States Public Health Service was especially influential in providing training for nurses. This agency carried on an extensive recruitment program, financed both basic and postgraduate training, including intensive short courses and refresher courses, and provided consultant service to schools of nursing with respect to acceleration of regular curricula.

The curricula of universities offering postgraduate courses in public health usually include instruction in public health organization and administration, epidemiology, sanitation, health education, and public health statistics, as well as a number of elective subjects. From table 2 of appendix D may be obtained information regarding the number and control of schools offering graduate degrees in public health and in sani-

tary or public health engineering, as well as those offering certificates in public health nursing. Both State universities and those controlled by nongovernmental agencies are represented in the group giving advanced training in public health.

Within the past decade, State health departments stimulated by Federal grants-in-aid have fostered postgraduate training of public health workers with good basic education. Tuition at an approved school of public health for formal postgraduate academic training and a stipend to help cover living expenses during their period of study are paid eligible personnel. Operation of programs of in-service field training in selected health departments under a similar arrangement is quite common also.

More nurses have received postgraduate training through Federal grant-in-aid programs than any other professional group; however, physicians, particularly health officers, and sanitation personnel, including both engineers and sanitarians without an engineering degree, also have been given supplementary training in considerable numbers. Laboratory personnel, statisticians, health educators, venereal disease investigators, and nutritionists are others who have been trained in like fashion. Only rarely have dentists received additional training. To a large extent, the distribution of trainees reflects differences in the total number of public health personnel of various professional classifications.

SUMMARY

This whole discussion of health organization in the United States which involves the relationship and interrelationship of numerous agencies at the several levels of government and of voluntary health agencies and establishments may be summarized in terms of service to people. Several typical life experiences are cited as illustrations. At birth, both the child and mother are recipients of a number of public health services, even when the baby is born in a hospital with private physicians and nurse in attendance. The mother in all likelihood has had prenatal laboratory tests made by the State health department and may have attended the prenatal clinics of the local health department. During the first few moments of the infant's life, silver nitrate or some similar product supplied by the same State agency is dropped in his eyes as a precaution against blindness. The birth is reported to the local registrar, who in many instances is also the local health officer, and thence transmitted to the State health department where it is recorded and filed for safekeeping. When the mother goes home with her new baby, she may have a public health nurse from either the local health department or a voluntary visiting nurse association visit her to teach the proper care and feeding of the infant and of herself.

Of particular importance to the child's health is the sanitary quality of milk which is used in the home. In communities where only pasteurized milk is sold, this problem is relatively simple if close supervision over the pasteurization plants is maintained by the local health department. If raw milk is used, the public health nurse offers instruction in home pasteurization, while the local sanitarian attempts to increase its safety through sanitary inspections of farms and dairies and collection of milk samples for bacteriological tests to be made either locally or by the State health department. The degree to which tuberculosis and Bang's disease in dairy herds are controlled by the State department of agriculture is also significant in determining the safety of fluid milk.

After the child has reached the proper age, his parents may have him immunized against the more serious communicable diseases—diphtheria, smallpox, whooping cough—by personnel of the local health department who use materials supplied by the State. Moreover, he may receive periodic check-ups on growth and development at well-child conferences conducted by the local health department staff.

During his school life the child will likely receive several physical examinations by representatives of the local health department or, perhaps, of the local school board, with recommendations for any indicated corrective measures. Such corrections are to be performed by the family physician if possible. Provision of dental examination and correction will probably follow much the same pattern, although dental examinations are not yet made as routinely as general physical examinations. In relatively few communities are the discovered defects, either medical or dental, corrected directly by the health department or the school board. The child is usually referred to the family physician or dentist or to a public clinic. A number of voluntary agencies provide service for especially needy cases. Regulations of State and local boards of health isolating persons suffering from any communicable illness are other health protections which are afforded the school children of this country. Sanitary supervision of the school plant and premises is also maintained by local and, less directly, State health departments. Finally, classroom instruction in personal hygiene is another health service afforded school children.

At industries where the adults are employed, the health department makes recommendations to management and labor for prevention of occupational illnesses and accidents. It also provides routine blood tests and mass X-ray examination for the detection of venereal diseases and tuberculosis, in order that treatment might be instituted during the early stages of the disease. Persons found to have either may be treated in State or county facilities maintained especially for that condition. Venereal disease hospitals are usually under the jurisdiction of the State health department or the United States Public Health Service. Tubercu-

losis hospitals are administered either by the State or local health agency, by the State or local welfare department, or by a special board or commission operated on either a State-wide basis or locally.

Should the family decide to take a vacation trip, it can do so with greater ease of mind because of the protection of milk and water used on the train afforded through sanitary control by the United States Public Health Service. The food they eat in strange restaurants can be enjoyed with more confidence because of activities of State and local health departments and of the Federal Food and Drug Administration for improvement of its quality and sanitation in its handling.

Meanwhile, in the ordinary course of everyday living, the entire family is benefiting by organized health services for the community. For example, sanitary control maintained over the municipal water supply and sewage disposal facilities is perhaps the most important single contribution to physical well-being. Regulation of garbage collection and disposal is important not only as an aesthetic service, but also as a means of rodent and, indirectly, typhus control.

Medical care for general illnesses is usually obtained by a family directly from the physician of its choice. For the most part, the costs of such care must be met by the family as illness occurs; however, those who are members of prepayment medical insurance schemes are able to distribute the cost of illness over a prolonged period. The professional competence of attending physicians is assured by State systems of professional licensure.

For solution of most public health problems, the average citizen applies to his local health department which renders routine services. However, in carrying out its program, the local organization depends upon both State and Federal agencies for financial assistance and scientific findings regarding cause and treatment of disease. Moreover, if the resources of the local staff are overtaxed, State and Federal consultation service is available also. While all of the health services referred to in this pamphlet are not available to all communities, the advances made in public health organization, administration, and performance during the past 25 years may well be a source of pride to the American people. At the same time, with the wide field yet to be developed, accomplishments to date can be considered only as stepping stones to further progress.

BIBLIOGRAPHY

(1) a. United States Government Manual–Summer 1944. Division of Public Inquiries, Office of War Information. Washington.
b. United States Government Manual–Spring 1945. Division of Public Inquiries, Office of War Information. Washington.
c. United States Government Manual—1946 (First Edition). Division of Public Inquiries, Government Information Service, Bureau of the Budget, Washington.

(2) Federal Security Agency. Created by the President's Reorganization Plan I, dated April 25, 1939, in accordance with the provisions of the Reorganization Act of 1939 (53 Stat. 561; 5 U.S.C. 133). Expanded in 1940 by Plans II and IV under authority of the same Act. Further expanded by Reorganization Plan No. 2 of 1946, under authority of the Reorganization Act of 1945.

(3) United States Public Health Service. Established July 16, 1798 by Act of Congress. Original and all subsequent acts broadening the scope of activities are consolidated under the Public Health Service Act of July 1, 1944—Public Law 410 (58 Stat. 682) and amended by the National Mental Health Act of July 3, 1946—Public Law 487 and the Federal Hospital Survey and Construction Act of August 13, 1946—Public Law 725.

(4) Bolton Nurse Training Act—Public Law 74, 78th Congress—1st session.

(5) Permanent Census Act. March 6, 1902 (32 Stat. 52), April 27, 1904 (33 Stat. 362), June 18, 1929 (46 Stat. 26). Functions of the Vital Statistics Division transferred to the Federal Security Agency by Reorganization Plan No. 2 of 1946 and made a part of the Public Health Service.

(6) St. Elizabeths Hospital. Established March 3, 1855, by Act of Congress (10 Stat. 682; 24 U.S.C. 161-65). Renamed by Act of July 1, 1916 (39 Stat. 309; U.S.C. 165). Transferred to Federal Security Agency by President's Reorganization Plan IV, effective June 30, 1940. Functions changed by Reorganization Plan No. 3 of 1946.

(7) Freedmen's Hospital. Created in 1865. Incorporated by Act of March 3, 1871 (16 Stat. 506; 24 U.S.C. 261). Transferred from the Department of the Interior to the Federal Security Agency by section 11 (b) of Reorganization Plan IV, effective June 30, 1940.

(8) Federal Social Security Act of 1935. (49 Stat. 629, as amended by 53 Stat. 1380; 42 U.S.C. 701-31). Children's Bureau transferred to the Federal Security Agency by Reorganization Plan No. 2 of 1946.

(9) United States Office of Education. Established March 2, 1867 by Act of Congress (14 Stat. 434; 20 U.S.C.1). Under the President's Reorganization Plan I, effective July 1, 1939, the United States Office of Education with all its functions was transferred from the Department of the Interior to the Federal Security Agency.

(10) Office of Vocational Rehabilitation. Created within the Federal Security Agency to administer the Barden-La Follette Act of July 6, 1943 (57 Stat. 374), in a series of amendments to the Vocational Rehabilitation Act of June 2, 1920.

(11) Social Security Administration. Established as the Social Security Board under provisions of the Social Security Act (49 Stat. 620; 29 U.S.C. 45b, also title 42), approved August 14, 1935. Administered as a part of the Federal Security Agency under the direction and supervision of the Federal Security Administrator in accordance with the Reorganization Act of 1939 (53 Stat. 561; 5 U.S.C. 133 R), and Reorganization Plan I, made effective July 1, 1939. Under Reorganization Plan No. 2 of 1946, the Social Security Board was abolished and its activities taken over by the Social Security Administration.

(12) Food and Drug Administration. Established by Food and Drugs Act of 1906 (34 Stat. 3915; 21 U.S.C. 1 secs. 1-5) and Agriculture Appropriation Act of 1931 (46 Stat. 392). Transferred to Federal Security Agency by President's Reorganization Plan IV, effective June 30, 1940.

(13) Federal Food, Drugs, and Cosmetic Act—(21 U.S.C. 301-392).

(14) Tea Importation Act (21 U.S.C. 41-50).

OF ILL. LIB

(15) Import Milk Act (21 U.S.C. 141-149).
(16) Federal Caustic Poison Act (15 U.S.C. 401-411).
(17) Filled Milk Act (21 U.S.C. 61-64).
(18) Services originally provided by the United States Employees' Compensation Commission. Established September 7, 1916 by Act of Congress (39 Stat. 742; 5 U.S.C. 751). Amendments: March 4, 1927 (44 Stat. 1424; 15 U.S.C. 432), May 17, 1928 (45 Stat. 600; 33 U.S.C. 901 note), August 16, 1941 (55 Stat. 622; 42 U.S.C. 1651), December 2, 1942 (56 Stat. 1028; 42 U.S.C. 1651, 1701-1717), and April 3, 1939 (53 Stat. 561: U.S.C. 133-133B). Commission abolished by Reorganization Plan No. 2 of 1946, under authority of the Reorganization Act of 1945.
(19) Federal Trade Commission. Created by Federal Trade Commission Act of September 26, 1914 (38 Stat. 717; 15 U.S.C. 41-51). Amended March 21, 1938 (52 Stat. 111; 15 U.S.C. 41, 44-45, 52-58).
(20) Fair Labor Standards Act of 1938 (52 Stat. 1060; 29 U.S.C. 201-19).
(21) Bureau of Animal Industry, Department of Agriculture. Established May 29, 1924 by Act of Congress. (43 Stat. 243; 7 U.S.C. 401) and (144 Stat. 499).
(22) Meat Inspection Act of June 30, 1906 (34 Stat. 674) and of March 4, 1907 (34 Stat. 1260).
(23) Insecticide Act of April 26, 1910 (36 Stat. 335).
(24) Formerly office of Labor, Department of Agriculture. Established under authority of Executive Order 9334 of April 19, 1943 and Acts of Congress of April 29, 1943 (57 Stat. 70; 50 U.S.C. App. 4351), February 14, 1944 (58 Stat. 11), and Public Law 367, 78th Congress, 2nd session. Transferred to the Office of Production and Marketing Administration as the Labor Branch of that office by Secretary's Memorandum 1118, of August 18, 1945.
(25) Bureau of Dairy Industry, Department of Agriculture. Established May 29, 1924 by Act of Congress. (43 Stat. 243; 7 U.S.C. 401) and (44 Stat. 499).
(26) Bureau of Entomology and Plant Quarantine, Department of Agriculture. Established by Agriculture Appropriation Act of 1935 (46 Stat. 467).
(27) Bureau of Human Nutrition and Home Economics, Department of Agriculture. Established by Agriculture Appropriation Act of 1924 (43 Stat. 1289) and Research Administration Memorandum 5, pursuant to Executive Order 9069, and in conformity with Secretary's Memorandums 960 and 986.
(28) Extension Service, Department of Agriculture. Established by Agriculture Appropriation Act of 1924 (42 Stat. 1289) and Secretary's Memorandum 436. Transferred to War Food Administration by Executive Order 9322, dated March 26, 1943, as amended by Executive Order 9334 of April 19, 1943.
(29) Farm Security Administration, Department of Agriculture. Originally Resettlement Administration by authority of Emergency Relief Appropriation Act of April 8, 1935 (49 Stat. 115) and Executive Order 7027 of April 30, 1935. Transferred to Department of Agriculture and name changed to Farm Security Administration by Executive Order 7530 of December 31, 1936 and Secretary's Memorandum 732 of September 1, 1937. Consolidated within War Food Administration by Executive Orders 9280, 9322, and 9334.
(30) Federal Works Agency. Established April 25, 1939 by President's Reorganization Plan I, under provisions of the Reorganization Act of 1939.
(31) National Housing Act of 1934 and subsequent amendments (48 Stat. 1246; 12 U.S.C. 1702), as amended by Acts of Congress approved May 28, 1935; August 23, 1935; April 3, 1936; April 17, 1936; February 19, 1937; April

22, 1937; February 3, 1938; June 3, 1939; March 28, 1941; June 28, 1941; September 2, 1941; May 26, 1942; March 23, 1943; October 14, 1943; October 15, 1943; and June 30, 1944. The National Housing Agency represents a consolidation (effectuated under the First War Powers Act, 1941, on February 24, 1942, by Executive Order 9070) of the housing functions and activities of a number of separate agencies.

(32) Bureau of Mines, Department of the Interior. Established May 16, 1910 by Act of Congress (36 Stat. 369; 30 U.S.C. 1 note) and Executive Order 6611.

(33) Fish and Wildlife Service. Established June 30, 1940 in accordance with Reorganization Plan III, pursuant to the Reorganization Act of 1939, approved April 3, 1939.

(34) Office of Indian Affairs, Department of the Interior. Established March 3, 1849 by Act of Congress (9 Stat. 395; 5 U.S.C. 481).

(35) Tennessee Valley Authority. Established May 18, 1933 by Act of Congress (48 Stat. 58; 16 U.S.C. 831-831 dd) and Executive Order 6161.

(36) United States Maritime Commission. Established by the Merchant Marine Act of 1939 (49 Stat. 1985; 46 U.S.C. 1111), which followed: Shipping Act of 1916 (39 Stat. 728; 46 U.S.C. 801-42), Merchant Marine Act of 1920 (41 Stat. 988; 46 U.S.C. 13, 597-), Merchant Marine Act of 1928 (45 Stat. 689; 46 U.S.C. 891-91x), Intercoastal Shipping Act of 1933 (47 Stat. 1425; 46 U.S.C. 843-48) and amendments to those Acts (as modified by the 1936 Act). Also Executive Order 9054.

(37) War Shipping Administration. Established February 7, 1942 under authority of Executive Order 9054 and First War Powers Act (55 Stat. 838, ch. 593; U.S.C. title 50 App., secs. 601 et seq.).

(38) Surgeon General's Office, Army Service Forces, War Department. Established August 7, 1789 by Act of Congress.

(39) Bureau of Medicine and Surgery, U. S. Navy. Established April 30, 1798 by Act of Congress.

(40) Veterans Administration. Established July 21, 1930 under authority of Executive Order 5398.

(41) Office of Community War Services. Executive Order 9338, dated April 29, 1943 transferred to the Federal Security Agency from the Office for Emergency Management functions of the Office of Defense Health and Welfare Services (formerly Office of the Coordinator of Health, Welfare, and Related Defense Activities headed by the Administrator of the Federal Security Agency). Under Order 9338 and a Federal Security Agency order implementing it, the Office of Community War Services was established as an integral part of the Office of the Administrator, Federal Security Agency.

(42) War Relocation Authority, Department of the Interior. Established March 18, 1942 under authority of Executive Order 9102.

(43) Committee for Congested Production Areas. Established April 7, 1943 under authority of Executive Order 9327.

(44) Office of Civilian Defense. Established May 20, 1941 under authority of Executive Order 8757.

(45) Office of Scientific Research and Development. Established June 28, 1941 under authority of Executive Order 8807.

(46) Bureau of Selective Service, War Manpower Commission. Established September 16, 1940 by Act of Congress. Transferred to the War Manpower Commission by Executive Order 9279.

(47) War Food Administration. Established December 5, 1942 as Food Production Administration and Food Distribution Administration. March 26, 1943, designated as Administration of Food Production and Distribution. Designated as War Food Administration on April 19, 1943. Authority: Executive Orders 9280, 9322, and 9334.
(48) State Department. Established September 15, 1789 by Act of Congress.
(49) Office of Inter-American Affairs. Established July 30, 1941 under authority of Executive Order 8840.
(50) Pan American Sanitary Bureau. Created by the Second International Conference of American States in Mexico City, October 22, 1901—January 31, 1902. Formally organized by the First Pan American Sanitary Conference in Washington, December 2-4, 1902 and reorganized by the Sixth Pan American Sanitary Conference, Montevideo, December 12-20, 1920, and succeeding conferences.
(51) Anglo-American Caribbean Commission. Joint commission of the governments of the United States and Great Britain. Establishment announced simultaneously by the two countries March 9, 1942.
(52) Digest of Appropriations for the Support of the Government of the United States for the Fiscal Year Ending June 30, 1945 and on Account of Deficiencies for Prior Years—Made during the first and second sessions of the 78th Congress (July 17, 1943 to July 31, 1944 inclusive). Treasury Department, Fiscal Service, Bureau of Accounts, Division of Bookkeeping and Warrants. U. S. Government Printing Office, Washington, 1944.
(53) Mountin, Joseph W. and Flook, Evelyn: Distribution of Health Services in the Structure of State Government. Public Health Bulletin No. 184 (Third Edition). U. S. Government Printing Office, Washington, 1943.
(54) Housing Directory 1945—Publication No. N211. National Association of Housing Officials. Chicago.
(55) Anderson, William: The Units of Government in the United States. Publication No. 83. Public Administration Service. Chicago, 1942.
(56) Mountin, Joseph W. and Norman, Nina L.: Joint city-county health units. The Municipal Year Book. The International City Managers' Association. Chicago, 1945.
(57) Emerson, Haven and Luginbuhl, Martha: Local Health Units for the Nation. The Commonwealth Fund. New York, 1945
(58) Mustard, Harry S.: Government in Public Health. The Commonwealth Fund. New York, 1945.
(59) Evaluation Schedule of the American Public Health Association. Committee on Administrative Practice. American Public Health Association. New York, 1943.
(60) Health Practice Indices, 1943-44. Committee on Administrative Practice. American Public Health Association. New York, 1945.
(61) Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.
(62) Gunn, Selskar M., and Platt, Philip S.: Voluntary Health Agencies—An Interpretive Study. The Ronald Press Co., New York, 1945.
(63) Reed, Louis S., and Vaughan, Henry F. Jr.: The coordination of medical and Blue Cross plans. Journal of the American Medical Association, May 5, 1945. Vol. 128—pp. 22-25. American Medical Association. Chicago.
(64) Unpublished data in files of the United States Public Health Service.
(65) Special Study No. 74. Hospital Service Plan Commission of the American Hospital Association. Chicago.

(66) Klem, Margaret: Prepayment Medical Care Organizations (Bureau Memorandum No. 55, Third Edition, 1945, Bureau of Research and Statistics, Social Security Board). U. S. Government Printing Office, Washington, 1945.
(67) Survey of Civilian Hospitals. American Hospital Directory, 1945. American Hospital Association. Chicago.
(68) Pennell, Elliott H., Mountin, Joseph W., and Pearson, Kay: Business Census of Hospitals, 1935—General Report. Supplement No. 154 to the Public Health Reports. U. S. Government Printing Office, Washington, 1939.
(69) War Agencies of the United States and New York State, State of New York Executive Department. Division of Commerce. Albany, August, 1943.
(70) Masters, Ruth D.: Handbook of International Organizations in the Americas. Carnegie Endowment for International Peace, Division of International Law. Washington, 1945.

APPENDIX A

TABLE 1.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was expended by agencies of each specified type (53)*

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total** expended by each agency								
			Health department	Special boards or commissions	Department of welfare	Board of control	Independent State hospitals, laboratories, etc.	Department of labor	State university or college	Department of agriculture	All other agencies of State government
Total	$285,715,800	$1.90	18.5	25.0	21.3	16.0	5.4	3.2	3.2	2.3	5.1
Alabama	2,668,900	0.94	42.9	45.2	[1]	-----	-----	1.1	-----	2.9	7.9
Arizona	1,130,500	2.26	15.6	34.3	14.0	30.6	1.0	-----	-----	-----	4.5
Arkansas	2,721,000	1.40	23.6	23.9	8.7	33.4	-----	-----	8.5	-----	1.9
California	14,096,400	2.04	17.4	-----	0.2	49.9	-----	20.4	7.2	1.6	3.3
Colorado	2,752,600	2.45	16.8	0.5	13.1	-----	42.0	-----	23.1	0.3	4.2
Connecticut	6,007,200	3.51	9.3	31.1	1.5	-----	49.3	1.2	-----	-----	7.6
Delaware	1,076,100	4.04	41.7	[1]	[1]	-----	55.2	[1]	-----	-----	3.1
District of Columbia	6,608,800	10.44	40.2	1.4	-----	-----	-----	-----	-----	-----	58.4
Florida	3,109,900	1.64	17.7	22.0	[1]	53.1	-----	-----	-----	3.8	3.4
Georgia	2,964,200	0.95	38.7	[1]	55.4	-----	-----	0.8	-----	4.9	0.2
Idaho	986,000	1.88	25.7	[2]23.3	37.1	-----	-----	-----	-----	12.2	1.7
Illinois	17,678,000	2.24	8.7	0.2	[3]80.0	-----	-----	1.2	[4]	4.6	5.3
Indiana	7,332,800	2.14	9.1	1.6	76.4	-----	-----	[1]	10.2	-----	2.7
Iowa	4,780,300	1.88	10.0	[2]0.4	[2]0.4	47.9	-----	0.2	34.0	4.7	2.4
Kansas	3,008,400	1.67	13.5	9.7	72.2	-----	-----	0.8	[1]	1.0	2.8
Kentucky	2,522,500	0.89	40.1	8.6	47.3	-----	-----	[1]	-----	-----	4.0
Louisiana	5,754,200	2.43	17.9	3.5	[1]	-----	76.2	0.1	-----	-----	2.3
Maine	2,023,900	2.39	18.3	0.5	[2]9.5	61.7	-----	[1]	-----	7.8	2.2
Maryland	4,102,000	2.25	18.6	48.5	0.1	-----	0.7	0.8	15.9	0.5	14.9
Massachusetts	13,781,200	3.19	27.5	52.2	[2]12.8	-----	-----	1.4	-----	3.3	2.8
Michigan	12,439,100	2.37	10.5	80.4	[2]0.2	-----	-----	[5, 2]	6.2	1.5	1.2
Minnesota	6,148,500	2.20	11.3	2.4	66.9	-----	-----	0.7	15.5	1.4	1.8
Mississippi	2,143,900	0.98	42.4	[2]11.6	0.5	41.2	-----	-----	-----	[4]	4.3
Missouri	5,058,400	1.34	14.2	[1]	0.1	79.3	-----	0.6	2.7	0.8	2.3
Montana	1,472,700	2.63	11.4	25.9	11.7	46.9	-----	-----	-----	1.9	2.2
Nebraska	1,724,700	1.31	9.1	[1]	-----	82.3	-----	0.9	-----	7.7	-----
Nevada	469,200	4.26	21.9	51.3	-----	17.9	-----	-----	1.8	1.6	5.5
New Hampshire	1,637,400	3.33	12.7	8.9	9.5	-----	61.5	0.6	-----	5.1	1.7
New Jersey	10,875,900	2.61	8.3	3.4	6.7	76.8	-----	1.5	-----	1.3	2.0
New Mexico	690,000	1.30	32.2	[1]	[2]19.0	-----	40.8	-----	-----	-----	8.0
New York	44,054,800	3.27	15.9	78.6	[1]	-----	-----	2.1	-----	2.1	1.3
North Carolina	3,260,400	0.91	36.3	14.1	0.6	-----	45.1	0.1	-----	[2]1.6	2.2
North Dakota	2,090,900	3.26	8.4	13.3	16.4	56.5	2.8	-----	-----	1.0	1.6
Ohio	12,932,800	1.87	7.2	31.1	51.2	-----	-----	1.9	[2]3.6	1.7	3.3
Oklahoma	3,470,300	1.49	15.6	6.0	[6]	54.8	-----	0.4	20.4	[1]	2.8
Oregon	3,119,600	2.86	9.1	[2]33.8	[2]3.7	45.7	-----	1.1	[2]1.4	2.9	2.3
Pennsylvania	26,098,000	2.64	14.2	1.0	65.2	-----	-----	12.4	-----	4.9	2.3
Rhode Island	2,355,300	3.30	33.7	1.4	60.2	-----	-----	0.9	-----	2.1	1.7
South Carolina	3,523,800	1.85	25.1	[1]	-----	-----	71.9	0.9	1.2	[1]	0.9
South Dakota	1,359,400	2.11	15.1	2.6	13.4	62.9	-----	-----	1.9	2.0	2.1
Tennessee	2,228,500	0.76	50.8	-----	[1]	44.2	-----	[4]	[1]	[2]2.2	2.8
Texas	5,512,600	0.86	20.5	[1]	[1]	70.3	-----	[1]	-----	-----	9.2
Utah	1,401,400	2.55	31.8	28.1	0.9	-----	34.4	-----	-----	3.4	1.4
Vermont	889,700	2.48	20.4	16.4	57.3	-----	-----	-----	-----	3.8	2.1

See footnotes at end of table.

TABLE 1.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was expended by agencies of each specified type (53)*—Continued.

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total** expended by each agency								
			Health department	Special boards or commissions	Department of welfare	Board of control	Independent State hospitals, laboratories, etc.	Department of labor	State university or college	Department of agriculture	All other agencies of State government
Virginia	$4,392,700	$1.64	42.6	[2]52.5	2.7	-----	-----	0.5	[1]	1.4	0.3
Washington	3,818,900	2.20	7.5	[2]0.1	[2]2.6	-----	-----	[2]20.2	-----	4.3	65.3
West Virginia	3,781,600	1.99	10.4	17.8	21.9	39.1	-----	1.3	-----	1.7	7.8
Wisconsin	7,092,400	2.26	9.1	1.7	2.9	[7]60.2	-----	-----	17.0	5.5	3.6
Wyoming	569,500	2.27	19.2	22.7	-----	48.9	-----	0.9	-----	2.0	6.3
Alaska	182,900	2.51	93.6	-----	[1]	-----	-----	-----	-----	-----	6.4
Hawaii	2,129,900	5.03	52.4	-----	2.3	19.9	22.6	-----	-----	-----	2.8
Puerto Rico	3,534,200	1.89	99.2	0.8	-----	-----	-----	[1]	-----	-----	-----
Virgin Islands	151,500	6.09	96.4	-----	[1]	-----	-----	-----	-----	-----	3.6

* Expenditures for the health services considered represent index rather than absolute amounts and include all funds expended directly by State agencies and allotted by State agencies to their local counterparts. Such funds may have been derived from State appropriations, from Federal grants, from special fees, from voluntary donations or from local tax sources. They do not include local monies expended locally. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview which was held sometime during the year 1940. In some instances, estimates were accepted in the absence of precise expenditure records; in others, it was impossible to secure even an estimate.

** Percentage distribution is based upon the expenditure information reported for each agency even though that amount might be incomplete.

[1] Information not available.

[2] Information incomplete.

[3] Represents expenditures of two separate agencies of this classification.

[4] Units of the University of Illinois rendering service included here operate jointly with the department of welfare and are financed by that agency.

[5] Less than one-tenth of 1 percent.

[6] Financial grant-in-aid to the crippled children's commission for administration. Figure included in expenditure of that agency.

[7] The board of control no longer functions in Wisconsin. Operation of tuberculosis hospitals has been transferred to the State health department and operation of mental hospitals is now a function of the department of public welfare. However, records for a complete fiscal year were not available under the new administrative set-up.

TABLE 2.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was derived from each specified source (53)*

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total derived from each source					
			State	Local	U. S. P. H. S.—Title VI	U. S. P. H. S.—V. D. funds	U. S. C. B.—Title V	Other
Total	$285,715,800	$1.90	81.4	3.9	3.2	1.0	2.5	8.0
Alabama	2,668,900	0.94	66.6	-------	11.0	5.3	8.9	8.2
Arizona	1,130,500	2.26	53.8	-------	4.9	1.2	8.3	31.8
Arkansas	2,721,000	1.40	80.4	-------	8.2	3.7	5.5	2.2
California	14,096,400	2.04	62.7	7.9	2.2	1.2	1.8	24.2
Colorado	2,752,600	2.45	62.2	9.3	4.5	1.2	4.8	18.0
Connecticut	6,007,200	3.51	72.6	13.0	1.7	0.4	1.2	11.1
Delaware	1,076,100	4.04	83.1	-------	4.0	0.5	4.6	7.8
District of Columbia	6,608,800	10.44	97.3	-------	1.0	0.1	1.6	-------
Florida	3,109,900	1.64	73.7	3.4	4.4	1.0	4.4	13.1
Georgia	2,964,200	0.95	78.8	0.1	9.9	2.0	7.1	2.1
Idaho	986,000	1.88	49.3	2.1	7.4	1.4	7.0	32.8
Illinois	17,678,000	2.24	93.9	-------	2.4	0.6	1.9	1.2
Indiana	7,332,800	2.14	93.4	1.7	2.7	0.7	1.5	-------
Iowa	4,780,300	1.88	49.6	31.5	3.8	0.9	2.4	11.8
Kansas	3,008,400	1.67	74.3	4.7	4.5	1.8	4.2	10.5
Kentucky	2,522,500	0.89	75.3	-------	9.0	2.2	7.4	6.1
Louisiana	5,754,200	2.43	93.8	-------	3.0	0.6	1.7	0.9
Maine	2,023,900	2.39	85.0	1.0	3.2	0.4	4.5	5.9
Maryland	4,102,000	2.25	72.9	0.8	3.2	0.6	4.1	18.4
Massachusetts	13,781,200	3.19	95.7	-------	1.6	0.4	1.3	1.0
Michigan	12,439,100	2.37	87.3	6.1	2.2	0.9	1.4	2.1
Minnesota	6,148,500	2.20	73.5	11.4	3.2	0.5	2.4	9.0
Mississippi	2,143,900	0.98	75.8	-------	10.0	4.3	6.5	3.4
Missouri	5,058,400	1.34	88.7	0.7	5.4	1.5	2.1	1.6
Montana	1,472,700	2.63	53.2	6.3	3.9	0.2	5.6	30.8
Nebraska	1,724,700	1.31	72.2	9.7	3.3	0.5	4.4	9.9
Nevada	469,200	4.26	31.3	2.3	6.7	0.7	7.0	52.0
New Hampshire	1,637,400	3.33	84.5	0.9	3.1	0.7	3.4	7.4
New Jersey	10,875,900	2.61	67.2	23.1	1.9	0.6	1.8	5.4
New Mexico	690,000	1.30	64.0	-------	10.4	1.3	17.5	6.8
New York	44,054,800	3.27	97.6	-------	1.3	0.4	0.7	[1]
North Carolina	3,260,400	0.91	68.0	-------	9.6	1.6	7.3	13.5
North Dakota	2,090,900	3.26	30.7	47.2	2.9	0.1	4.8	14.3
Ohio	12,932,800	1.87	63.2	0.3	2.4	1.0	1.5	31.6
Oklahoma	3,470,300	1.49	82.7	2.7	5.4	2.6	3.3	3.3
Oregon	3,119,600	2.86	58.2	-------	2.9	1.0	4.1	33.8
Pennsylvania	26,098,000	2.64	85.9	-------	1.5	0.5	1.1	11.0
Rhode Island	2,355,300	3.30	93.2	-------	2.3	0.4	2.2	1.9
South Carolina	3,523,800	1.85	87.0	0.6	5.5	1.5	4.5	0.9
South Dakota	1,359,400	2.11	77.4	-------	5.4	0.5	5.0	11.7
Tennessee	2,228,500	0.76	63.4	4.6	13.6	3.0	7.6	7.8
Texas	5,512,600	0.86	80.6	-------	7.6	4.7	6.4	0.7
Utah	1,401,400	2.55	58.9	2.5	4.8	1.0	6.2	26.6
Vermont	889,700	2.48	85.8	0.7	4.8	0.1	6.1	2.5

See footnotes at end of table.

TABLE 2.—*Approximate total and per capita annual expenditures* by all official State agencies for health activities, and proportion of the total amount which was derived from each specified source (53)*—Continued.

State or Territory	Approximate total annual expenditure* by all official State agencies for health activities	Approximate per capita annual expenditure* by all official State agencies for health activities	Percent of total derived from each source					
			State	Local	U. S. P. H. S.—Title VI	U. S. P. H. S.—V. D. funds	U. S. C. B.—Title V	Other
Virginia	$4,392,700	$1.64	81.0	7.0	5.8	2.4	3.6	0.2
Washington	3,818,900	2.20	73.0	0.6	2.8	1.1	2.2	20.3
West Virginia	3,781,600	1.99	73.0	0.5	3.9	0.6	3.2	18.8
Wisconsin	7,092,400	2.26	71.9	17.0	2.3	0.3	1.9	6.6
Wyoming	569,500	2.27	67.5	[1]	4.8	0.3	7.0	20.4
Alaska	182,900	2.51	22.6	13.4	22.2	1.1	38.1	2.6
Hawaii	2,129,900	5.03	91.9	0.5	2.7	0.6	2.9	1.4
Puerto Rico	3,534,200	1.89	81.8	----	7.4	3.4	7.4	----
Virgin Islands	151,500	6.09	86.1	----	----	2.5	----	11.4

* Expenditures for the health services considered represent index rather than absolute amounts and include all funds expended directly by State agencies and allotted by State agencies to their local counterparts. Such funds may have been derived from State appropriations, from Federal grants, from special fees, from voluntary donations or from local tax sources. They do not include local monies expended locally. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview which was held sometime during the year 1940. In some instances, estimates were accepted in the absence of precise expenditure records; in others, it was impossible to secure even an estimate.

[1] Less than one-tenth of 1 percent.

APPENDIX B

Preliminary compilation of health laws pertaining to organization of full-time county health departments, county district health departments, and district health departments for two or more local political units other than counties (*SUBJECT TO REVISION*).[1]

State	*Summary of Provisions*
ALABAMA ..... Code 1940 Title 22	Authorization to establish full-time county health departments (sec. 5). Authorization to establish full-time county district health departments (sec. 8 (6)).
ARIZONA	No health unit laws found.
ARKANSAS ..... Digest of Statutes (Pope, 1917)	Provision of State aid for county health work (sec. 6444, 6445).
CALIFORNIA ..... Health and Safety Code	Provision for full-time county health officer (Division 1, pt. 2, ch. 1, art. 1,-455) County health administration for cities (ch. 1, art. 2, 476-486). Local full-time county health districts (ch. 6) Definition art. 1, 880-884, Formation art. 2, 900-922, Administration Operation art. 5, 940-944.
COLORADO	No health unit laws found.
CONNECTICUT ..... 1935 Cumulative Supplement to 1930 General Statutes.	Provision for sanitary districts of towns, cities and boroughs (sec. 929C).
DELAWARE	No health unit laws found.
FLORIDA ..... Statutes, 1941	Provision for full-time county health units (154.01). Provision for full-time county district health units (154.05).
GEORGIA ..... Code	Provision for sanitary districts of one or of two or more counties under full-time commissioners (sec. 88-301-312).
IDAHO	No health unit laws found.
ILLINOIS ..... Laws 1943 Act July 9, 1943	Provision for full-time county or county district health department (sec. 1).
INDIANA ..... Statute Annotated (Burns, 1933)	Provision for full-time county or city health officers (sec. 35-122). Provision for full-time county district health departments (sec. 35-125).

[1] Material compiled by William Fowler, Bureau of State Services, U. S. Public Health Service.

State	*Summary of Provisions*
IOWA ..... Code 1939	Provision for county health unit plan (not designated full-time) (2246.1-2246.4).
KANSAS ..... Laws 1943, C223	Provision for joint board of health for 2 or more cities, counties or city and counties (not designated full-time) (sec. 1).
KENTUCKY ..... Revised Statutes (Baldwin, 1942)	Provision for full-time county health departments, and full-time county district health departments (212.040 to 212.120). Provision for city and county board of health in county with city of first class (212.350).
LOUISIANA ..... General Statutes (Dart)	Provision for full-time parish health units (3366, 3379). Provision for full-time parish district health units (3367-3379). Parishes and municipalities acting jointly (6283.4).
MAINE ..... Public Acts (1933) Chapter 1	Provision of full-time local health officers for district of several towns, cities or organized plantations. (sec. 91).
MARYLAND ..... Code Annotated (Flack, 1939)	Provision for full-time county health officer (art. 43, sec. 51).
MASSACHUSETTS ..... Annotated Laws	Provision for health officers for unions of 2 or more towns (not designated full-time) (ch. 111, sec. 27A).
MICHIGAN ..... Statutes Annotated	Provision for county health departments (not designated full-time) (14.161). Provision for county district health departments (not designated full-time) (14.167).
MINNESOTA	No health unit laws found.
MISSISSIPPI ..... Code 1930	Provisions for full-time county and county district health departments (sec. 4926).
MISSOURI ..... Revised Statutes, 1939	Provision for deputy State commissioners of health in counties (not designated as full-time) (9745).
MONTANA	No health unit laws found.
NEBRASKA ..... Accumulative Supplement 1929 to 1941 Compiled Statutes Laws, 1943 (C. 152)	Provisions that counties of more than 200,000 may set up health districts with full-time directors (71.3601-71.3612). Provision for full-time county and county district health departments (sec. 1, 2).
NEVADA ..... Supplement (1931-1941) to Compiled Laws (1929)	Provision for county district health departments (not designated full-time) (sec. 5268.01). Provision for cities to join county or district health department (sec. 5268.02).

State	*Summary of Provisions*
NEW HAMPSHIRE..... Revised Laws (1942) Chapter 148	Provision for health officers for several towns (not designated full-time) (sec. 6).
NEW JERSEY..... Statutes Annotated	Provision for joint full-time health officers for 2 or more adjacent municipalities (26:3-22; 26:3-84; 26:3-88).
NEW MEXICO..... Statutes Annotated (1941)	Mandatory establishment of 10 health districts each employing district health officer (71-201, 71-202 and 71-203).
NEW YORK..... Consolidated Laws (McKinney) Public Health Law	Provision for single health officers serving 2 or more towns or villages (not designated full-time) (sec. 20, par. 2, 3). Provision for county health districts serving all or part of a county under direction of full-time county health commissioners (sec. 20-6, par. 2, 7).
NORTH CAROLINA..... Code 1939	Provision for full-time county health officers (7068). Provision for special tax, sanitary districts employing health officer (not designated full-time) (7078). Provision for full-time local and district health departments for any town, city and county or group of such units (7085) (1).
NORTH DAKOTA..... Laws 1943 Chapter 220	Provision for full-time county and county district health units (sec. 2).
OHIO ..... Code Annotated (Throckmorton, 1940)	Provision for health districts for cities as city health districts and for townships and villages of each county as general health districts and for unions of districts (not designated full-time) (sec. 1261-16; sec. 1261-20; sec. 1261-21).
OKLAHOMA ..... Statutes (1941) Title 63	Provision for funds for county departments of health (not designated full-time) (sec. 510). Provision for health districts of 2 or more counties under district superintendent of health (not designated full-time) (sec. 514). Provision for cooperative health departments for counties and cities (sec. 516).
OREGON ..... Compiled Laws Annotated	Provision for full-time county health department (sec. 99-204; 99-207).
PENNSYLVANIA	No health unit laws found.
RHODE ISLAND..... General Laws (1938) C. 329	Provision for 2 or more towns to combine to employ health officers (sec. 14).

APPENDIX B—Continued

State	Summary of Provisions
SOUTH CAROLINA Acts 1943 Number 211	Provision of funds for aid to county and district health work through county or district health departments (not designated full-time) (sec. 1).
SOUTH DAKOTA	No health unit laws found.
TENNESSEE Annotated Code (Williams) Title 13.C1	Provision for full-time county health departments (art. IV, 5783). Provision for city cooperation (art. IV, 5784). Provision for full-time county district health departments (art. IVA, 5788.1).
TEXAS Statutes Annotated (Vernon) Civil Statutes A. 4436a	Provision for city-county health units in counties with cities of 90,000-120,000 population (not designated full-time) (1, sec. 1). Provision for health units in counties under 22,000 (not designated full-time) (3, sec. 1).
UTAH	No health unit laws found.
VERMONT	No health unit laws found.
VIRGINIA	No health unit laws found.
WASHINGTON	No health unit laws found.
WEST VIRGINIA	Provision for full-time county and municipal health officers (sec. 1279). Provision for county district health officers (sec. 1280).
WISCONSIN Statutes, 1941	Provision for full-time county health departments (140.09). Provision for joint full-time health officers for contiguous towns, villages, and cities (141.04).
WYOMING	No health unit laws found.

APPENDIX C

TABLE 1.—*Total hospital facilities (exclusive of Army and Navy) in the United States according to medical type and type of control, 1943*[1]

Medical type and type of control	Hospitals		Beds	
	Number	Percent of total	Number	Percent of total
All medical types:				
All controls	6,057	100.0	1,260,973	100.0
Federal	234	3.9	88,285	7.0
State	534	8.8	610,207	48.4
Local governmental	918	15.1	189,044	15.0
Nongovernmental	4,371	72.2	373,437	29.6
General and allied special:				
All controls	4,798	100.0	507,607	100.0
Federal	160	3.3	37,840	7.4
State	75	1.6	23,196	4.6
Local governmental	596	12.4	108,070	21.3
Nongovernmental	3,967	82.7	338,501	66.7
Nervous and mental:				
All controls	579	100.0	650,490	100.0
Federal	32	5.5	44,231	6.8
State	269	46.5	554,333	85.2
Local governmental	55	9.5	32,028	4.9
Nongovernmental	223	38.5	19,898	3.1
Tuberculosis:				
All controls	459	100.0	81,131	100.0
Federal	18	3.9	4,631	5.7
State	75	16.3	24,767	30.5
Local governmental	229	49.9	39,438	48.6
Nongovernmental	137	29.9	12,295	15.2
Institutional:				
All controls	221	100.0	21,745	100.0
Federal	24	10.9	1,583	7.3
State	115	52.0	7,911	36.4
Local governmental	38	17.2	9,508	43.7
Nongovernmental	44	19.9	2,743	12.6

[1] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 2.—*Distribution by size of hospital facilities (exclusive of Army and Navy) of each medical type and each type of control, 1943*[1]

Medical type and size of hospitals	Control of hospital									
	All controls		Federal		State		Local governmental		Nongovernmental	
	Number of hospitals	Number of beds	Number of hospitals	Number of beds	Number of hospitals	Number of beds	Number of hospitals	Number of beds	Number of hospitals	Number of beds
All medical types:										
All sizes	6,057	1,260,973	234	88,285	534	610,207	918	189,044	4,371	373,437
Under 50 beds	2,530	67,333	81	2,562	72	2,268	295	8,990	2,082	53,513
50–99 beds	1,354	91,473	21	1,373	58	4,220	240	16,243	1,035	69,637
100–249 beds	1,272	193,359	29	4,909	78	12,325	192	29,561	973	146,564
250 beds and over.	901	908,808	103	79,441	326	591,394	191	134,250	281	103,723
General and allied special:										
All sizes	4,798	507,607	160	37,840	75	23,196	596	108,070	3,967	338,501
Under 50 beds	2,210	57,604	62	1,933	4	156	245	7,291	1,899	48,224
50–99 beds	1,100	74,264	14	946	15	1,136	156	10,399	915	61,783
100–249 beds	1,040	157,727	22	3,864	32	4,893	90	13,711	896	135,259
250 beds and over.	448	218,012	62	31,097	24	17,011	105	76,669	257	93,235
Nervous and mental:										
All sizes	579	650,490	32	44,231	269	554,333	55	32,028	223	19,898
Under 50 beds	107	3,140	-----	-------	1	28	1	32	105	3,080
50–99 beds	75	4,993	-----	-------	6	452	-----	-------	69	4,541
100–249 beds	60	9,909	-----	-------	4	496	20	3,914	36	5,499
250 beds and over.	337	632,448	32	44,231	258	553,357	34	28,082	13	6,778
Tuberculosis:										
All sizes	459	81,131	18	4,631	75	24,767	229	39,438	137	12,295
Under 50 beds	98	3,153	2	83	4	163	41	1,411	51	1,496
50–99 beds	126	8,703	3	154	7	563	76	5,328	40	2,658
100–249 beds	131	19,574	5	747	23	3,933	67	9,759	36	5,135
250 beds and over.	104	49,701	8	3,647	41	20,108	45	22,940	10	3,006
Institutional:										
All sizes	221	21,745	24	1,583	115	7,911	38	9,508	44	2,743
Under 50 beds	115	3,436	17	546	63	1,921	8	256	27	713
50–99 beds	53	3,513	4	273	30	2,069	8	516	11	655
100–249 beds	41	6,149	2	298	19	3,003	15	2,177	5	671
250 beds and over.	12	8,647	1	466	3	918	7	6,559	1	704

[1] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 3.—*General and allied special hospital facilities (exclusive of Army and Navy) in each State, 1943, and beds per 1,000 population*

State	Estimated civilian population[1]	Number of hospitals[2]	Number of beds[2]	Beds per 1,000 population
Total, all States	127,307,884	4,798	507,607	4.0
Alabama	2,718,273	76	6,249	2.3
Arizona	569,357	43	3,308	5.8
Arkansas	1,735,564	58	3,757	2.2
California	7,881,694	267	33,870	4.3
Colorado	1,067,095	67	5,430	5.1
Connecticut	1,748,402	50	8,161	4.7
Delaware	273,614	10	1,182	4.3
District of Columbia	816,982	20	5,493	6.7
Florida	2,012,046	81	6,718	3.3
Georgia	2,976,645	102	6,878	2.3
Idaho	473,166	40	1,908	4.0
Illinois	7,563,770	240	34,067	4.5
Indiana	3,383,312	108	10,337	3.1
Iowa	2,276,876	113	7,630	3.4
Kansas	1,678,722	97	6,763	4.0
Kentucky	2,549,108	76	5,575	2.2
Louisiana	2,316,681	62	8,790	3.8
Maine	782,312	56	3,401	4.3
Maryland	1,982,947	50	8,331	4.2
Massachusetts	4,093,072	162	24,521	6.0
Michigan	5,377,329	194	23,814	4.4
Minnesota	2,525,558	177	13,012	5.2
Mississippi	1,996,333	83	3,816	1.9
Missouri	3,524,790	111	14,977	4.2
Montana	470,033	56	3,375	7.2
Nebraska	1,176,023	88	4,909	4.2
Nevada	130,637	14	757	5.8
New Hampshire	453,333	33	2,256	5.0
New Jersey	4,080,485	106	16,154	4.0
New Mexico	490,119	42	2,501	5.1
New York	12,442,784	389	69,803	5.6
North Carolina	3,346,987	130	9,047	2.7
North Dakota	536,510	44	2,749	5.1
Ohio	6,828,352	170	22,984	3.4
Oklahoma	1,987,941	102	5,887	3.0
Oregon	1,172,674	64	5,236	4.5
Pennsylvania	9,273,242	272	40,117	4.3
Rhode Island	694,616	13	2,868	4.1
South Carolina	1,789,662	53	5,049	2.8
South Dakota	544,866	46	2,438	4.5
Tennessee	2,818,226	87	6,917	2.5
Texas	6,259,584	299	16,342	2.6
Utah	583,572	29	1,970	3.4
Vermont	316,074	21	1,492	4.7
Virginia	2,769,828	84	8,325	3.0
Washington	1,905,239	82	8,211	4.3
West Virginia	1,732,355	64	6,070	3.5
Wisconsin	2,945,355	145	13,183	4.5
Wyoming	235,739	22	979	4.2

[1] Estimated Civilian Population of the United States, by Counties: November 1, 1943. Series P-44, No. 3. Bureau of the Census. U. S. Department of Commerce. Washington. February 15, 1944.

[2] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 4.—*Nervous and mental hospital facilities (exclusive of Army and Navy) in each State, 1943, and beds per 1,000 population*

State	Estimated civilian population[1]	Number of hospitals[2]	Number of beds[2]	Beds per 1,000 population
Total, all States	127,307,884	579	650,490	5.1
Alabama	2,718,273	5	8,070	3.0
Arizona	569,357	2	1,008	1.8
Arkansas	1,735,564	2	5,827	3.4
California	7,881,694	36	35,765	4.5
Colorado	1,067,095	9	6,761	6.3
Connecticut	1,748,402	16	11,700	6.7
Delaware	273,614	2	1,753	6.4
District of Columbia	816,982	2	7,689	9.4
Florida	2,012,046	5	6,052	3.0
Georgia	2,976,645	5	9,832	3.3
Idaho	473,166	3	1,734	3.7
Illinois	7,563,770	32	48,101	6.4
Indiana	3,383,312	14	15,308	4.5
Iowa	2,276,876	12	12,472	5.5
Kansas	1,678,722	8	7,452	4.4
Kentucky	2,549,108	10	8,537	3.3
Louisiana	2,316,681	6	8,181	3.5
Maine	782,312	5	3,738	4.8
Maryland	1,982,947	16	11,057	5.6
Massachusetts	4,093,072	32	32,498	7.9
Michigan	5,377,329	20	28,147	5.2
Minnesota	2,525,558	12	15,836	6.3
Mississippi	1,996,333	5	5,647	2.8
Missouri	3,524,790	16	16,046	4.6
Montana	470,033	1	1,920	4.1
Nebraska	1,176,023	4	5,832	5.0
Nevada	130,637	1	350	2.7
New Hampshire	453,333	2	3,090	6.8
New Jersey	4,080,485	24	26,105	6.4
New Mexico	490,119	2	1,080	2.2
New York	12,442,784	59	105,241	9.2
North Carolina	3,346,987	10	9,082	2.7
North Dakota	536,510	2	3,163	5.9
Ohio	6,828,352	24	30,469	4.5
Oklahoma	1,987,941	9	9,346	4.7
Oregon	1,172,674	5	6,180	5.3
Pennsylvania	9,273,242	42	48,341	5.2
Rhode Island	694,616	4	4,089	5.9
South Carolina	1,789,662	3	5,572	3.1
South Dakota	544,866	2	2,620	4.8
Tennessee	2,818,226	10	9,126	3.2
Texas	6,259,584	17	19,557	3.1
Utah	583,572	2	2,065	3.5
Vermont	316,074	4	2,305	7.3
Virginia	2,769,828	11	12,643	4.6
Washington	1,905,239	8	9,581	5.0
West Virginia	1,732,355	6	4,581	2.6
Wisconsin	2,945,355	49	17,118	5.8
Wyoming	235,739	3	1,823	7.7

[1] Estimated Civilian Population of the United States, by Counties: November 1, 1943. Series P-44, No. 3. Bureau of the Census. U. S. Department of Commerce. Washington. February 15, 1944.

[2] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 5.—*Tuberculosis hospital facilities (exclusive of Army and Navy) in each State, 1943, and beds per death from tuberculosis, 1944*

State	Tuberculosis deaths (all forms)[1]	Number of hospitals[2]	Number of beds[2]	Beds per death from tuberculosis
Total, all States	54,731	459	81,131	1.5
Alabama	1,269	8	508	0.4
Arizona	784	13	989	1.3
Arkansas	826	2	1,351	1.6
California	3,826	32	4,995	1.3
Colorado	419	13	1,280	3.1
Connecticut	661	6	1,788	2.7
Delaware	123	3	214	1.7
District of Columbia	547	1	686	1.3
Florida	823	4	530	0.6
Georgia	1,141	3	882	0.8
Idaho	109	1	50	0.5
Illinois	3,218	32	4,309	1.3
Indiana	1,221	11	1,704	1.4
Iowa	341	5	788	2.3
Kansas	357	2	482	1.4
Kentucky	1,726	5	1,128	0.7
Louisiana	1,158	5	456	0.4
Maine	279	4	473	1.7
Maryland	1,326	6	1,547	1.2
Massachusetts	1,698	23	4,038	2.4
Michigan	1,814	26	5,090	2.8
Minnesota	693	15	2,113	3.0
Mississippi	831	1	425	0.5
Missouri	1,487	5	1,938	1.3
Montana	175	1	260	1.5
Nebraska	211	1	200	0.9
Nevada	76			
New Hampshire	105	2	240	2.3
New Jersey	1,856	16	4,244	2.3
New Mexico	345	5	569	1.6
New York	6,055	56	12,354	2.0
North Carolina	1,239	20	2,818	2.3
North Dakota	86	1	363	4.2
Ohio	2,787	22	3,317	1.2
Oklahoma	880	5	807	0.9
Oregon	307	4	589	1.9
Pennsylvania	4,020	16	4,964	1.2
Rhode Island	300	4	997	3.3
South Carolina	660	5	866	1.3
South Dakota	178	2	322	1.8
Tennessee	1,881	7	1,216	0.6
Texas	3,126	15	2,134	0.7
Utah	73	1	100	1.4
Vermont	124	3	175	1.4
Virginia	1,344	7	1,575	1.2
Washington	702	12	1,575	2.2
West Virginia	764	6	1,356	1.8
Wisconsin	726	21	2,293	3.2
Wyoming	34	1	33	1.0

[1] Tuberculosis Mortality in Each State, 1944. Public Health Reports 61:129 (February 1, 1946).

[2] Material tabulated from Hospital Number, Journal of the American Medical Association, March 25, 1944. American Medical Association. Chicago.

TABLE 6.—*Total civilian hospital facilities in the United States, 1944, and projected estimates of their assets, together with corresponding information for general civilian hospital facilities of the same year, by type of control*[1]

Facilities, 1944	All civilian hospitals	General civilian hospitals of designated control				
		All controls	Federal	State	Local governmental	Nongovernmental
Total hospital facilities:						
Number of hospitals	6,085	4,383	153	95	566	3,569
Total bed capacity	1,284,867	498,987	43,108	27,592	111,263	317,024
Total bassinet capacity	78,945	74,034	733	1,600	9,967	61,734
Projected estimates for total above facilities:						
Plant valuation	$3,819,299,932	$2,318,214,449	$149,024,356	$103,994,248	$439,155,061	$1,626,040,784
Average valuation per bed	$2,972	$4,646	$3,457	$3,769	$3,947	$5,098
Year's purchase of supplies	$493,858,706	$344,889,730	$13,794,560	$12,885,464	$46,507,934	$271,701,772
Average purchase per bed	$384	$691	$320	$467	$418	$857
Year's purchase of equipment	$39,426,933	$29,790,648	$1,349,280	$962,961	$4,717,551	$22,760,856
Average purchase per bed	$31	$60	$31	$35	$42	$71
Year's pay roll	$698,859,463	$499,077,449	$44,271,916	$22,404,704	$90,679,345	$341,721,484
Average pay roll per bed	$544	$1,000	$1,027	$812	$815	$1,078
Full-time personnel	685,983	530,500	27,589	23,729	84,560	394,622
Average personnel per 100 beds	53	106	64	86	76	124

[1] Information summarized from tables presented in Survey of Civilian Hospitals. American Hospital Directory 1945. American Hospital Association. Chicago.

APPENDIX D

TABLE 1.—*Schools in the continental United States offering accredited basic courses in medicine, dentistry, sanitary engineering or civil engineering with a sanitary option, and nursing, and number of graduates in 1941*

Type of basic course	Number of schools of designated control offering each type of basic training					Graduates in 1941
	All controls	Federal	State	Local governmental	Non-governmental	
Medicine	[1]69	1	27	3	38	[2]5,275
Dentistry	[3]39	1	12	2	24	[3]1,568
Sanitary engineering or civil engineering with sanitary option	[4]27	..	18	..	9	[5]
Nursing	[6]1,297	2	80	119	1,096	[7]24,899

[1] Totals — Journal of the American Medical Association. 129: 1 (September 1, 1945) American Medical Association. Chicago.

Control — Educational Directory 1945-1946. Part III, Colleges and Universities. Federal Security Agency, U. S. Office of Education. Government Printing Office. Washington, 1945.

[2] Total — Journal of the American Dental Association. 31: 1931 (November 1, 1944) American Dental Association. Chicago.

Control — Educational Directory 1945-1946. See footnote 1.

[3] Journal of the American Dental Association. 30: 957 (June 1, 1943) American Dental Association. Chicago.

[4] Total — Engineers' Council for Professional Development: Thirteenth Annual Report for Year Ending September 30, 1945. Engineering Societies Building, 25-33 W. 39th St., New York.

Control — Educational Directory 1945-1946. See footnote 1.

[5] Information not available. Graduates of civil engineering courses with sanitary option are not segregated from all civil engineering graduates.

[6] Total — A List of Schools of Nursing Meeting Minimum Requirements Set by Law and Board Rules in the Various States and Territories. National League of Nursing Education, 1790 Broadway, New York, 1943.

[7] Facts About Nursing — 1945. The Nursing Information Bureau of the American Nurses' Association cooperating with The National League of Nursing Education and the National Organization for Public Health Nursing — 1790 Broadway, New York.

APPENDIX D—Continued

TABLE 2.—*Schools in the continental United States offering graduate degrees or certificates in public health, public health or sanitary engineering, and public health nursing, and number of students receiving degrees or certificates during the academic year 1944-1945*

Type of degree or certificate	Number of schools of designated control offering each type of training[1, 2]				Number of students receiving graduate degrees or certificates from schools of each type of control[1, 2]			
	All controls	State	Local governmental	Nongovernmental	All controls	State	Local governmental	Nongovernmental
Public health	12	6	--------	6	200	112	--------	88
Public health engineering	18	11	--------	7	38	17	--------	21
Public health nursing	30	10	1	19	884	285	31	568

[1] Totals—American Journal of Public Health—Vol. 35, No. 12, December 1945—p. 1253. American Public Health Association, New York.

[2] Control—Educational Directory 1945–1946. Part III, Colleges and Universities. Federal Security Agency, U. S. Office of Education. Government Printing Office, Washington, 1945.

APPENDIX E

TABLE 1.—*Population, total number of physicians, dentists, and nurses, and number per hundred thousand population in 1940*

State	Population 1940	Number physicians 1940 [1]	Number dentists 1940 [2]	Number nurses 1941 [3]	Per 100,000 population		
					Physicians	Dentists	Nurses
Total	131,669,275	175,382	70,121	286,698	133.2	53.3	217.7
Alabama	2,832,961	2,075	605	2,659	73.2	21.4	93.9
Arizona	499,261	594	153	1,246	119.0	30.6	249.6
Arkansas	1,949,387	1,829	384	1,479	93.8	19.7	75.9
California	6,907,387	11,909	5,399	23,930	172.4	78.2	346.4
Colorado	1,123,296	1,964	664	3,689	174.8	59.1	328.4
Connecticut	1,709,242	2,598	1,084	7,928	152.0	63.4	463.8
Delaware	266,505	339	105	990	127.2	39.4	371.5
District of Columbia	663,091	2,243	493	2,733	338.3	74.3	412.2
Florida	1,897,414	2,276	714	2,265	120.0	37.6	119.4
Georgia	3,123,723	2,825	823	4,001	90.4	26.3	128.1
Idaho	524,873	423	215	995	80.6	41.0	189.6
Illinois	7,897,241	12,188	5,940	17,086	154.3	75.2	216.4
Indiana	3,427,796	4,132	1,808	6,979	120.5	52.7	203.6
Iowa	2,538,268	3,084	1,620	5,857	121.5	63.8	230.7
Kansas	1,801,028	2,070	1,014	3,705	114.9	56.3	205.7
Kentucky	2,845,627	2,761	795	2,551	97.0	27.9	89.6
Louisiana	2,363,880	2,464	787	4,761	104.2	33.3	201.4
Maine	847,226	992	377	3,071	117.1	44.5	362.5
Maryland	1,821,244	2,988	870	4,903	164.1	47.8	269.2
Massachusetts	4,316,721	7,889	2,809	14,827	182.8	65.1	343.5
Michigan	5,256,106	6,362	2,647	10,660	121.0	50.4	202.8
Minnesota	2,792,300	3,527	2,071	6,684	126.3	74.2	239.4
Mississippi	2,183,796	1,497	416	1,475	68.6	19.0	67.5
Missouri	3,784,664	5,297	2,287	6,723	140.0	60.4	177.6
Montana	559,456	537	277	2,133	96.0	49.5	381.3
Nebraska	1,315,834	1,635	918	2,159	124.3	69.8	164.1
Nevada	110,247	167	54	226	151.5	49.0	205.0

See footnotes at end of table.

TABLE 1.—*Population, total number of physicians, dentists, and nurses, and number per hundred thousand population in 1940*—Continued

State	Population 1940	Number physicians 1940 [1]	Number dentists 1940 [2]	Number nurses 1941 [3]	Per 100,000 population		
					Physicians	Dentists	Nurses
New Hampshire	491,524	656	224	2,248	133.5	45.6	457.4
New Jersey	4,160,165	5,813	2,675	9,865	139.7	64.3	237.1
New Mexico	531,818	439	114	1,038	82.5	21.4	195.2
New York	13,479,142	27,396	10,204	32,084	203.2	75.7	238.0
North Carolina	3,571,623	2,740	786	4,290	76.7	22.0	120.1
North Dakota	641,935	518	262	1,010	80.7	40.8	157.3
Ohio	6,907,612	9,318	3,761	14,658	134.9	54.4	212.2
Oklahoma	2,336,434	2,352	743	2,419	100.7	31.8	103.5
Oregon	1,089,684	1,461	830	3,349	134.1	76.2	307.3
Pennsylvania	9,900,180	13,529	5,911	29,512	136.7	59.7	298.1
Rhode Island	713,346	961	377	1,854	134.7	52.8	259.9
South Carolina	1,899,804	1,402	361	2,094	73.8	19.0	110.2
South Dakota	642,961	508	301	1,291	79.0	46.8	200.8
Tennessee	2,915,841	2,908	843	3,695	99.7	28.9	126.7
Texas	6,414,824	6,898	2,015	7,211	107.5	31.4	112.4
Utah	550,310	575	306	1,403	104.5	55.6	254.9
Vermont	359,231	523	152	1,644	145.6	42.3	457.6
Virginia	2,677,773	2,889	844	5,120	107.9	31.5	191.2
Washington	1,736,191	2,200	1,255	5,573	126.7	72.3	321.0
West Virginia	1,901,974	1,834	597	2,953	96.4	31.4	155.3
Wisconsin	3,137,587	3,523	2,107	7,006	112.3	67.2	223.3
Wyoming	250,742	274	124	666	109.3	49.5	265.6

[1] American Medical Directory, Sixteenth edition 1940. American Medical Association, Chicago.

[2] Sixteenth Census of the United States: 1940 Population, Third Series, the Labor Force, Table 11. U. S. Bureau of the Census, 1942.

[3] Facts about Nursing, 1943. Page 108, the Nursing Information Bureau of the American Nurses' Association cooperating with the National League of Nursing Education and the National Organization for Public Health Nursing.

TABLE 2.—*Full-time personnel of designated occupational classifications employed in 1946 by the 48 State and District of Columbia health departments and by full-time city, county, and multi-county health departments of each State* [1]

State	Number of full-time personnel of each classification										
	All classifications	Physicians	Nurses	Dentists	Sanitation personnel		Laboratory personnel	Health educators	Nutritionists	Clerical, administrative, and fiscal personnel	Others
					Engineers	Others					
All States	36,277	1,873	8,686	218	671	4,848	2,288	267	122	11,175	6,129
Alabama	862	55	181	3	31	112	47	4	1	294	134
Arizona	148	7	40	------	1	23	8	1	1	44	23
Arkansas	416	17	88	------	5	40	12	6	4	196	48
California	2,624	178	600	13	14	515	125	12	9	713	445
Colorado	170	5	34	1	4	17	14	1	------	77	17

See footnote at end of table.

TABLE 2.—*Full-time personnel of designated occupational classifications employed in 1946 by the 48 State and District of Columbia health departments and by full-time city, county, and multi-county health departments of each State* [1]—Continued

State	Number of full-time personnel of each classification										
	All classifications	Physicians	Nurses	Dentists	Sanitation personnel		Laboratory personnel	Health educators	Nutritionists	Clerical, administrative, and fiscal personnel	Others
					Engineers	Others					
Connecticut	497	34	94	2	19	36	57	3	3	181	68
Delaware	97	7	29	1	1	12	5	1	1	29	11
District of Columbia	593	33	113	20	4	85	16	1	------	130	191
Florida	1,008	42	179	5	10	170	49	5	1	255	292
Georgia	1,125	53	282	1	58	115	66	3	1	271	275
Idaho	103	5	28	------	2	10	10	2	1	35	10
Illinois	2,327	85	35	463	31	173	181	10	6	793	550
Indiana	406	11	76	1	11	73	30	7	1	137	59
Iowa	223	14	59	1	11	10	32	1	1	76	18
Kansas	378	25	78	2	12	52	27	4	1	143	34
Kentucky	953	58	234	1	6	135	31	3	3	357	125
Louisiana	698	41	116	2	8	103	37	3	2	277	109
Maine	176	14	58	1	4	13	12	------	1	66	7
Maryland	1,009	49	334	4	12	110	97	4	3	276	120
Massachusetts	1,524	55	414	25	16	244	99	13	12	366	280
Michigan	1,900	82	533	16	40	127	179	20	12	500	391
Minnesota	496	20	80	1	20	63	37	3	1	213	58
Mississippi	659	54	134	------	11	77	20	6	4	254	99
Missouri	769	29	160	7	19	159	29	2	------	256	108
Montana	79	7	21	1	3	7	9	1	------	27	3
Nebraska	151	9	27	------	2	11	14	4	1	73	10
Nevada	42	3	9	3	1	5	7	------	------	13	1
New Hampshire	109	7	32	1	6	7	9	------	1	34	12
New Jersey	340	11	24	1	17	21	39	2	------	184	41
New Mexico	206	30	46	------	1	21	9	------	------	84	15
New York	5,138	209	1,522	3	54	547	410	37	16	1,509	831
North Carolina	1,159	69	298	10	20	141	50	21	3	303	244
North Dakota	99	5	21	------	4	7	10	1	1	39	11
Ohio	1,446	106	473	3	26	198	59	4	7	378	192
Oklahoma	477	32	88	1	12	73	39	2	1	126	103
Oregon	364	28	87	1	3	52	14	3	1	113	62
Pennsylvania	974	24	185	7	54	137	32	15	4	448	68
Rhode Island	181	10	32	7	3	19	18	------	1	65	26
South Carolina	670	41	173	5	14	118	21	8	1	227	62
South Dakota	104	5	23	1	5	12	9	1	------	36	12
Tennessee	841	61	192	5	15	137	45	9	5	232	140
Texas	1,755	71	234	8	29	461	114	16	1	460	361
Utah	148	8	63	1	3	9	8	2	1	46	7
Vermont	79	4	31	------	1	3	7	------	1	27	5
Virginia	948	64	204	12	16	130	41	2	3	280	196
Washington	669	36	164	1	9	112	35	9	2	194	107
West Virginia	339	22	64	1	4	50	16	6	1	120	55
Wisconsin	763	36	255	4	17	95	51	9	2	202	92
Wyoming	35	2	11	------	2	1	2	------	------	16	1

[1] Information submitted to the United States Public Health Service by State health departments through the Annual Combined Report and Plan of State Health Departments and the Report of Personnel, Facilities, and Services of Local Health Jurisdictions.

No information on local personnel was available from New Jersey and Pennsylvania.

APPENDIX F

TABLE 1.—*Total in millions expended and percentage distribution of general-government expenditures, by governmental levels for their own functions: 1941* [1]

(Excludes payments from funds received from other public units; includes payments to other public units)

Function	According to percents that functions are of total expenditure by each governmental level			
	Total	Federal	State	Local
Total expenditure (inclusive of debt retirement) [2]	$24,277	$13,878	$4,837	$5,562
	100.0	100.0	100.0	100.0
Total cost payments (exclusive of debt retirement)	96.2	99.5	93.9	91.6
General administrative, legislative, and judicial	5.0	3.3	4.9	8.2
Protection	30.7	51.7	3.4	7.9
Military forces	27.5	51.4	----	----
Police	1.7	.1	1.1	4.9
Fire	.8	----	.2	2.7
Inspection and other	.6	.2	2.1	.3
Transportation	8.2	2.5	21.7	11.2
Highways	6.9	(*)	21.7	11.2
Waterways and other	1.3	2.5	----	----
Natural resources	5.9	9.6	2.9	1.0
Agriculture	4.9	8.1	2.2	.6
Forests, reclamation, floods, and other	1.0	1.5	.7	.4
Health	.7	.2	1.5	1.1
Hospitals	1.9	.1	6.6	2.8
Sanitation	1.2	----	----	4.0
Corrections	.7	.1	2.2	.9
Welfare	12.3	13.5	12.4	10.1
Work relief	6.9	12.9	----	----
General relief	1.9	.6	2.4	4.0
Other public assistance	2.9	(*)	8.6	5.0
Institutional and other	.5	(*)	1.4	1.1
Old-age and unemployment insurance	8.1	7.2	26.3	.1
Administration	.5	.3	1.8	(*)
Benefits	2.6	1.6	10.7	(*)
Net additions to reserves	5.1	5.3	13.8	.1
Schools	10.5	.3	7.0	30.5
Libraries	.2	(*)	.1	.7
Recreation	.9	.2	.4	2.3
Pensions [3]	1.0	.8	1.4	1.2
Contributions to credit corporations and public-service enterprises [4]	1.1	1.2	.1	1.4
Interest	6.9	8.5	2.8	6.2
Debt retirement	3.8	.5	6.1	8.4
Miscellaneous	.9	.3	.3	2.2

[1] Financing Federal, State, and local governments: 1941, table 26. Special Study No. 24, final, U. S. Department of Commerce, Bureau of the Census, September 1942.

[2] Due to rounding, the sum of the parts does not always equal 100.0.

[3] Preliminary estimate of government contributions to pension funds, not payments to beneficiaries.

[4] Net contributions by general government to credit corporations and public-service enterprises for which gross expenditures are shown in separate tables.

*Less than 0.1 of 1 percent.

—U. S. GOVERNMENT PRINTING OFFICE: 1951

4.09
n3m
o.36

Every American should know

Every American

The Dictionary says:

"-FREEDOM FROM PHYSICAL DISEASE OR PA

614.59
Un 3m
no. 36

hould know *

THE dictionary says health is a freedom—"freedom from physical disease or pain."

The President of the United States has said the opportunity for health is a right. Every American citizen should be assured "the right to adequate medical care and the opportunity to achieve and enjoy good health."

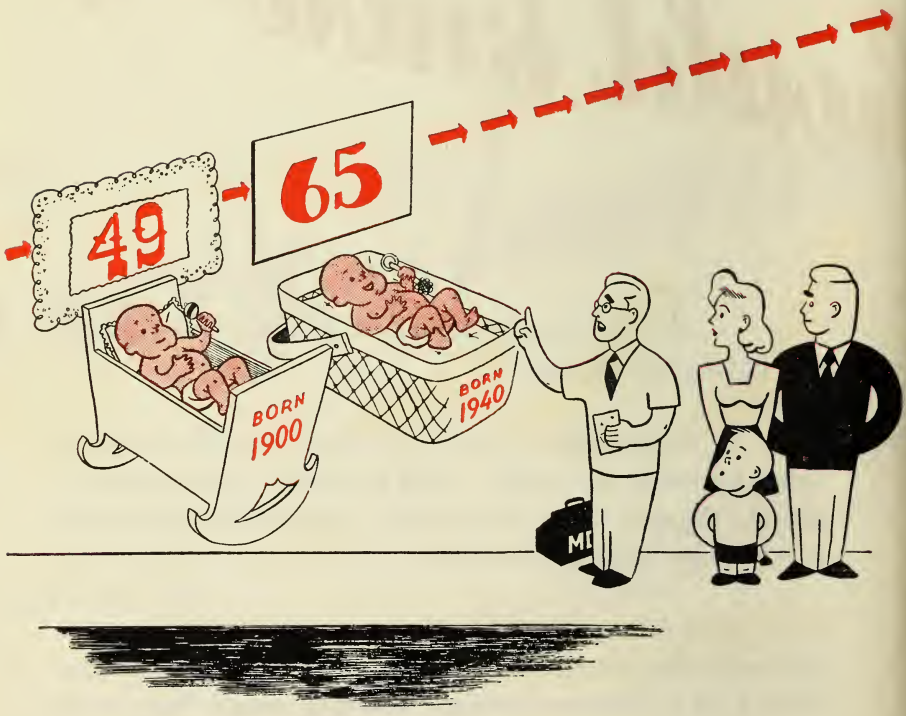
A fifth freedom for which to work. A right that you and every other American should have the chance to enjoy. That covers a lot of territory—from our own back yards to every corner of the Nation.

Along with this freedom and right there is a responsibility—the responsibility of knowing the facts about the Nation's health. As a first step toward assuring the opportunity for good health to all our citizens, every American should know—

the state of the Nation's health.
how we can improve it.

YOU MAY FEEL SECURE

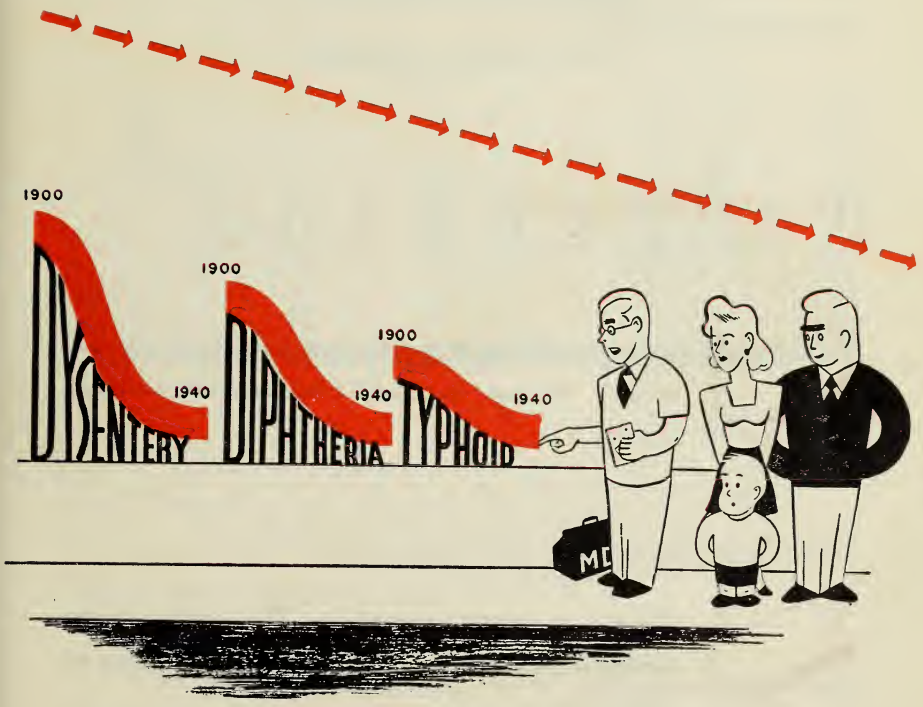
You may feel secure about the health of the Nation and of yourself because of past progress in building a healthier America. You may argue that we are a lot better off than we used to be.



That's true. We *are* a lot better off

Since 1900, medicine has made remarkable progress. New ways of preventing, fighting, and curing disease have been discovered. Life expectancy at birth has increased 16 years.

Perhaps our most spectacular victory has been that over communicable diseases. Typhoid fever, dysentery, diphtheria, and many others used to claim thousands of lives each year. Then the American people—our parents and grandparents—decided to do something about the diseases that threatened their families with alarming frequency.



Sanitation, immunization, and other programs of community control were set up. As a result of such programs a water supply polluted with the germs of typhoid and dysentery is not likely to bring death to the people of your town. The child down the street is less likely to die from diphtheria.

True—we've come a long way in the control of communicable diseases, and in other health fields, too.

BUT—WE STILL HAVE A LONG WAY TO GO

We must not only hold the forts that were taken yesterday. We must also win the victories that will give us health security today and tomorrow.

Let's stop playing ostrich

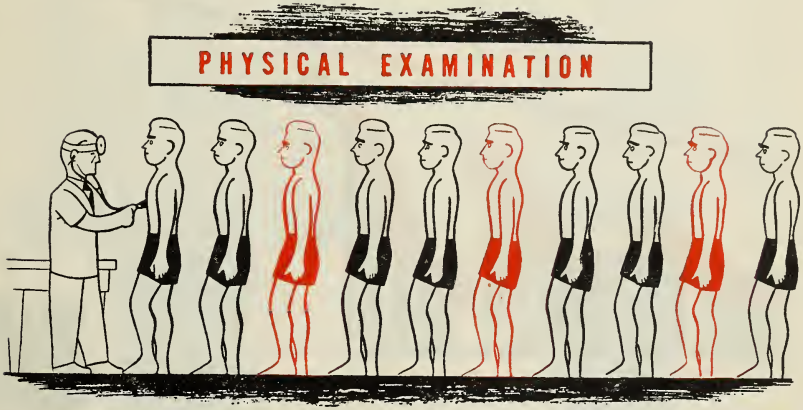
Before we can win the victories, we must see the enemy. We must face the Nation's health picture as it really is.

There's no getting around it. The health of the American people today is not what most of us like to think it is.

We visualize the typical young American man as strong-limbed and able, clear-eyed and confident—the American of the movies and the advertisements.

That is how we think of him, but here are the facts.

When doctors examined young men for military service, they found that—



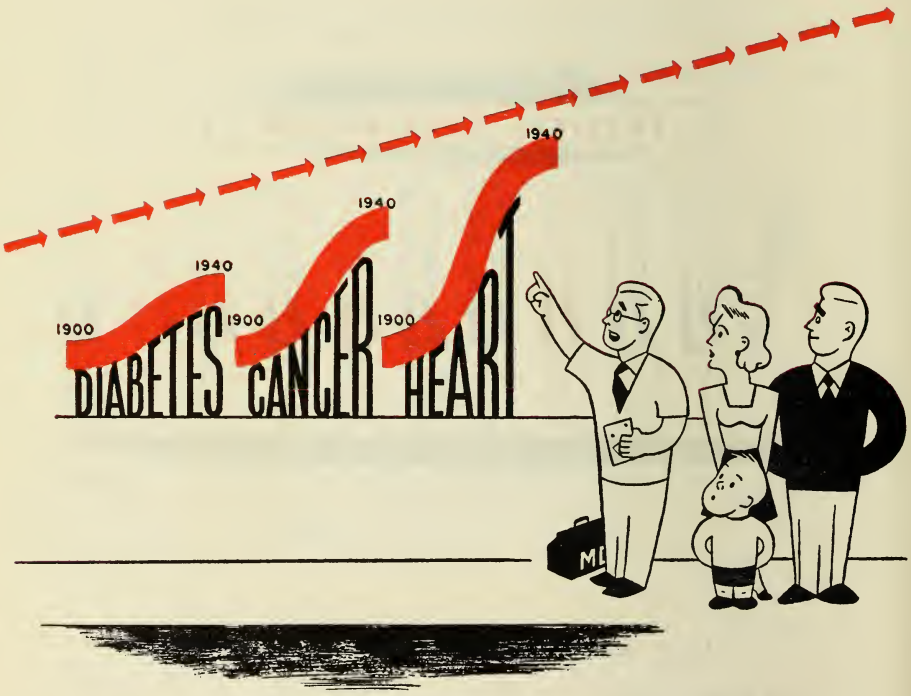
Every third man had some physical or mental defect which made him unfit for duty.

These were the *young* men of America—between the ages of 18 and 45—who should have been in their prime.

Some more unpleasant facts—

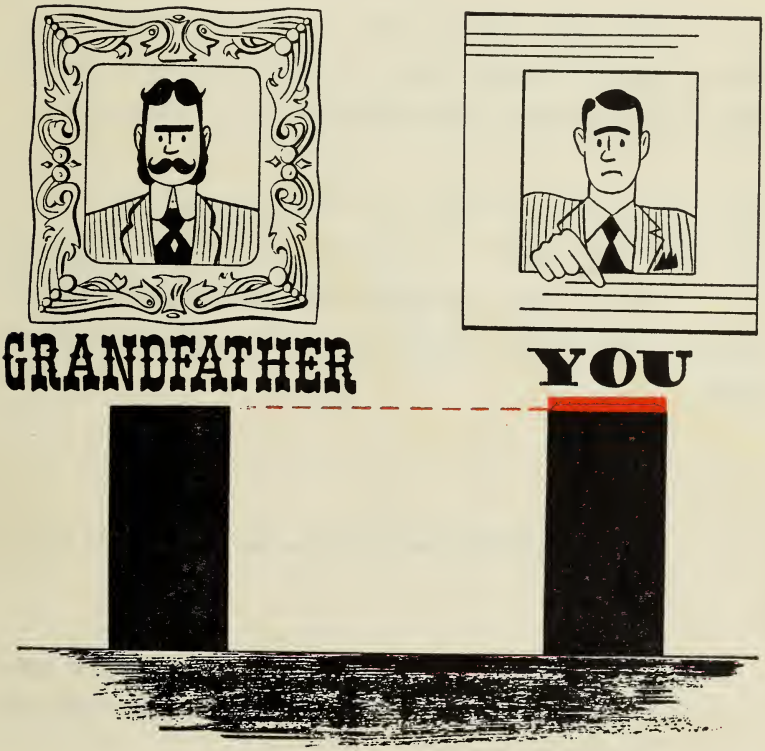
Many diseases that disable us are still on the march—arthritis, rheumatic fever, mental illnesses.

Certain killer diseases are on the *increase* in every State of the Union—heart disease, cancer, diabetes.



These killer diseases are the ones that are likely to strike at middle age—just when you should be at the peak of your earning power. Unless they are brought under control, at 40 you can look forward to a life only slightly longer than our grandparents'.

Programs of sanitation or immunization which have done so much to eradicate communicable diseases aren't the answer to



the unsolved health problems of today. Most of the diseases which still disable and kill us are not spread by contagion or contamination. They strike from *within*. The only way to conquer them is through adequate care and treatment of *individuals*.

America's health needs are urgent. We cannot afford to relax in a false security. We have played ostrich long enough when it comes to our Nation's health.

The job ahead

You may still feel there is nothing to worry about. What if America's health needs *are* urgent? American medical care, you may point out, is superior to that of any other country.

You're right. At its *best* this country's medical care is the best in the world. But the best is not available to enough people.

Poor people have more sickness but they get less care.

People who live in rural areas do not get the same amount or quality of medical attention as those who live in our cities.

Millions of our people are without adequate medical care.

THOUSANDS DIE EACH YEAR FROM CAUSES THAT COULD HAVE BEEN PREVENTED.

Besides keeping up the good work of the past and chalking up advances in the present and the future, we must do one more thing. We must see that the benefits of medical progress are made available to *everyone*.

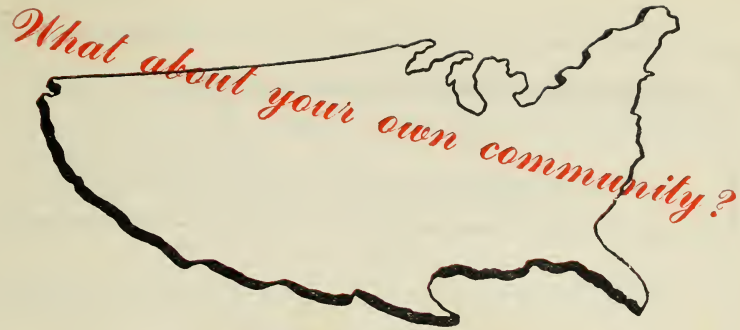
If we agree that every American citizen should have the opportunity to enjoy good health, we cannot be satisfied until the health needs of a nation are met.

any proposals, both private and public, have been made for meeting these needs. They are built

upon the medical knowledge which has been responsible for our progress to date. Their basic points are substantially the same:

More hospitals, health centers, and other medical, health, and rehabilitation facilities.
Better distribution of doctors throughout the country.
Full-time public health departments in every part of the country.
Strengthening of professional education in medical and related fields.
Encouragement and support of medical research.
Ready access for every individual to all necessary medical, hospital, and related services.

[ONLY THROUGH A NATIONAL PROGRAM THAT MEETS THE HEALTH NEEDS OF A NATION, CAN EVERY AMERICAN CITIZEN BE ASSURED THE RIGHT TO GOOD HEALTH]



What about your own community? Do you live in a place where health problems are taken care of? Or are you and your neighbors among the millions who are without adequate medical attention?

The answers to the following questions will tell you something about the adequacy of the health services and facilities in your community. A more complete appraisal would require the help of professional survey workers from your local or State health department or from the American Public Health Association.

Quick Quiz

1. Is there at least one practicing doctor for every 1,000 people?

YES..... NO.....

(In 1943 almost one-fifth of our counties had only one practicing doctor to every 3,000 or more persons)

2. Is there at least one practicing dentist for every 2,000 people?

YES..... NO.....

(Although this is the average for the country, much more dental service is needed.)

3. Are Public Health Nursing services available?

YES ..... NO.....

(909 of the 3,000 American counties do *not* have these services.)

4. Are there sufficient hospital beds in your community for the needs of its citizens?

YES ..... NO.....

(Experts estimate that there should be an average of 4.5 general hospital beds per thousand population available to the citizens of every State.)

5. Is your community in an area served by a local health department with a full-time health officer and staffed by trained people who are appointed on the basis of a merit system?

YES ..... NO.....

(1,223 counties in this country are not in areas served by health departments.)

6. Is there a health center in your community where mothers can get advice for maternal health before and after the birth of their babies?

YES ..... NO.....

(In 1942 approximately three-fourths of our rural counties did *not* have them.)

7. Are you able to get a physical examination at regular periods (at a fee which you can afford to pay) which includes the following checkups?

Chest X-ray—to make sure your lungs are healthy?

YES ..... NO.....

Urinalysis—to test for diabetes or diseases of the kidneys?

YES ..... NO.....

Blood Hemoglobin Test—to test for some types of anemia and other diseases of the blood?

YES ..... NO.....

Blood Test—for syphilis?

YES ..... NO.....

Dental Examination—to check for diseases of the teeth which may cause pain or discomfort and later may result in arthritis, neuritis, or various infections of other organs?

YES ..... NO.....

Gynecological Examination—for serious diseases of women?

YES ..... NO.....

(These are checkups which should be included in *every* routine physical examination . . . Other facilities which ought to be available when needed, are . . . Electrocardiograph Test—for signs of heart disease; Gastric Analysis—for signs of stomach cancer or ulcers and pernicious anemia; Chest Fluoroscopy—for certain types of chest tumors and abnormal heart conditions.)

8. Is there a convalescent home in your community where you could afford to go if your doctor advised it?

YES ..... NO.....

(Countless Americans *don't* have access to such services.)

9. Do the industries in your community and your local industrial hygiene office cooperate on problems of working conditions which affect health?

YES..... NO.....

(About 30 million people work in industry. Last year only 6½ million benefited from the services of State and Federal industrial hygiene experts.)

10. Is there a mental hygiene clinic in your vicinity where you can get advice on problems of mental health?

YES..... NO.....

No. 36 [illegible publication] *June 1946*

FEDERAL SECURITY AGENCY
U. S. PUBLIC HEALTH SERVICE
WASHINGTON 25, D. C.

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 10 cents

U. S. GOVERNMENT PRINTING OFFICE 16—48679-1

14.09
In3m
no.36
1947

BETTER HEALTH for your COMMUNITY

FEDERAL SECURITY AGENCY
UNITED STATES PUBLIC HEALTH SERVICE
(Miscellaneous Publication 36, Revised 1947)

a local Health Unit

PROMOTES GOOD HEALTH

PREVENTS DISEASE

FOR YOUR WHOLE COMMUNITY

TO BE MOST EFFECTIVE

A LOCAL HEALTH UNIT SHOULD

OPERATE FULL-TIME

BE STAFFED BY WELL-TRAINED PERSONNEL

BE A BASIC COMMUNITY SERVICE LIKE YOUR FIRE AND WATER DEPARTMENTS

614.09
Ln3m
no.36
1947

A FULL-TIME LOCAL HEALTH UNIT PAYS OFF

BY RAISING HEALTH STANDARDS

BY LOWERING THE DEATH RATE

FOR YOUR WHOLE COMMUNITY

THE COMMUNITY WITHOUT A FULL-TIME HEALTH DEPARTMENT PAYS A HIGH PRICE IN PREVENTABLE SICKNESS AND DEATH

Look at this Before and After Picture of One Community.

In 1937, Jones County, Miss., started a full-time health unit for its 47,000 residents. In 1944, although its population had increased by more than 5,000, its number of illnesses and deaths had decreased. Here are some of the results Jones County obtained by spending approximately one dollar a year per person for health protection:

DEATHS BY AGE GROUPS	1937	1944
UNDER 65 YEARS OF AGE	365	266
OVER 65 YEARS OF AGE	135	162
DEATHS UNDER 15 YEARS OF AGE FROM CERTAIN PREVENTABLE CAUSES		
DIPHTHERIA	4	1
PNEUMONIA	17	8
INFLUENZA	10	2
DIARRHEA AND ENTERITIS	8	3
SYPHILIS	2	0
TOTAL	41	14
STILLBIRTHS	54	38
CASES OF ILLNESS (all age groups)		
MALARIA	983	503
TUBERCULOSIS	63	30
WHOOPING COUGH	55	27
DIPHTHERIA	22	7
SCARLET FEVER	13	3
TYPHOID FEVER	5	0

PUBLIC HEALTH AUTHORITIES AGREE

that it takes a population of at least 50,000 to support an adequate local health unit. Communities having a population of less than 50,000 may join with neighboring communities to provide efficient health services.

THE MINIMUM STAFF RECOMMENDED

for a population of 50,000 includes: One full-time medical officer, a sanitary engineer, a sanitarian, ten public health nurses, three clerks, part-time clinicians.

Larger populations will need a larger and more diverse staff.

TODAY PUBLIC HEALTH IS A SPECIALTY

Authorities recommend appropriate public health training for all professional staff members.

A DOLLAR A YEAR,

approximately, for each person in your community can maintain a full-time professionally staffed Local Health Unit. This will provide only basic health services. With additional services, the cost will run to $2.50.

THE COST OF YOUR HEALTH DEPARTMENT

is usually paid by local, State, and Federal taxes.

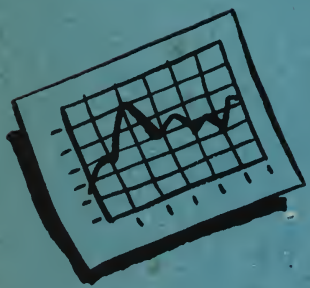
HERE'S WHAT

A FULL-TIME LOCAL HEAL

Control communicable diseases—smallpox, typhoid fever, diphtheria, scarlet fever—provide facilities for immunizations, vaccinations

Control tuberculosis—diagnosis, X-ray, hospitalization

Control venereal diseases—diagnosis, out-patient treatment



Give physical examinations to school children

Conduct health programs for mothers and children

Provide public health nursing services in clinics, homes, and schools

Provide information—pamphlets, posters, charts, and answering inquiries—on personal and community health and assist in health education.

IIT CAN DO FOR YOU

AND YOUR COMMUNITY

Vork with State industrial hygiene units to promote adult health programs in industry

ssist in preventing home accidents

spect sanitation in public places—restaurants, tourist and trailer camps, swimming pools, public restrooms, hospitals and sanitaria

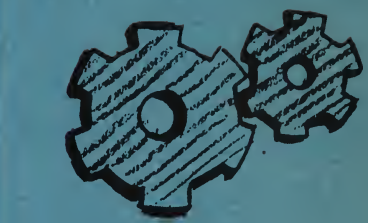
ssist communities and industries in preventing stream pollution

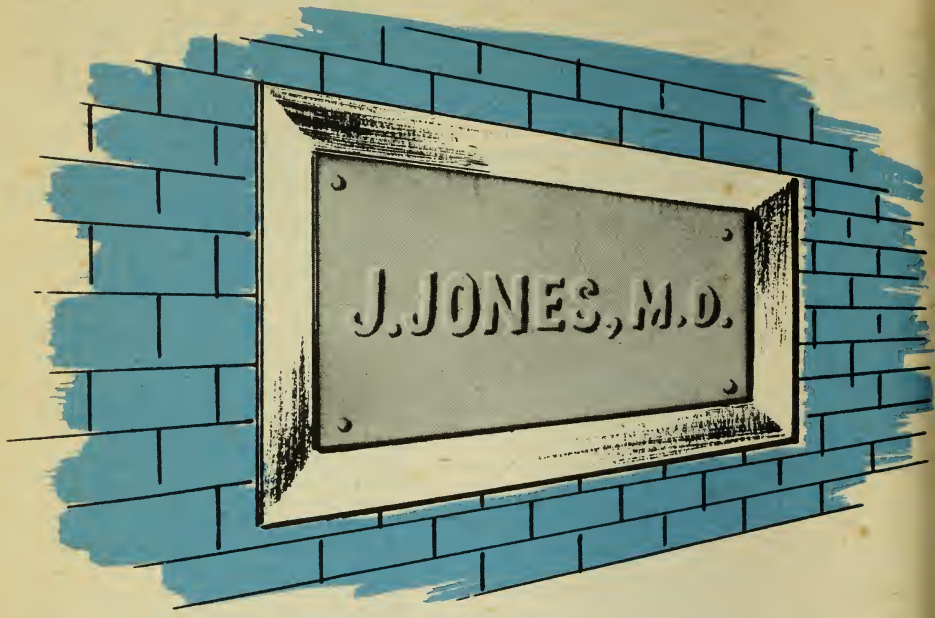
nduct control programs to eliminate rodents and disease-carrying insects—mosquitoes, flies

rvey housing conditions and assist in planning better housing

feguard water, milk, and food supplies

ork with State health departments in programs on dental care, nutrition, cancer control, mental health





HERE'S WHAT A FULL-TIME LOCAL HEALTH UNIT CAN DO FOR YOUR PRIVATE PHYSICIAN

- Provide a weekly health report on current communicable diseases
- Furnish public health nursing service
- Offer diagnostic consultive services
- Provide certain laboratory services
- Distribute free drugs and biologics when provided by State health departments
- Analyze vital statistics

ERE'S WHAT LEADERS SAY ABOUT FULL-TIME LOCAL HEALTH UNITS

AMERICAN MEDICAL ASSOCIATION

Resolution passed by House of Delegates urges its trustees to "use all appropriate resources and influences of the Association to the end that at the earliest possible date complete coverage of the Nation's area and population by local, county, district, or regional full-time modern health services be achieved."

AMERICAN PUBLIC HEALTH ASSOCIATION

Governing Council resolved that "collaboration with other professional, official, and voluntary organizations be sought to obtain total coverage of the Nation by local health units at the earliest practicable date."

GENERAL FEDERATION OF WOMEN'S CLUBS

Resolution adopted urging "State federations and individual clubs to encourage the establishment of full-time local health services where none exist and the strengthening of existing services."

NATIONAL CONGRESS OF PARENTS AND TEACHERS

One point of health action program adopted by convention is "to cooperate in every possible way with public health departments; to intensify and expand present local health services and facilities; and also to spread sound health information throughout the community."

THE ASSOCIATION OF STATE AND TERRITORIAL HEALTH OFFICERS

Has adopted the report of its Committee on Hospital and Medical Services that "it is important to the health of the people of the country that adequate coverage of the Nation with full-time local health units be accomplished promptly as a first step in advancing essential health."

HOW CAN YOUR COMMUNITY GET A FULL-TIME LOCAL HEALTH UNIT?

- WORK FOR IT
- VOTE FOR IT
- PAY FOR IT

For Further Information Concerning a Full-Time Local Health Unit

Write to

YOUR STATE HEALTH DEPARTMENT

U. S. GOVERNMENT PRINTING OFFICE: 1947—O—747536

4.C
n 3m
o.37

MEDICAL SOCIAL SERVICE IN TUBERCULOSIS CONTROL

MISCELLANEOUS PUBLICATION 37

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

1946

MEDICAL SOCIAL SERVICE
IN
TUBERCULOSIS CONTROL

MISCELLANEOUS PUBLICATION 37

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

1946

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 10 cents

CONTENTS

Endorsement: Surgeon General Thomas Parran iv

Statement: Herman E. Hilleboe, Medical Director, Chief, Tuberculosis Control Division v

Introduction vii

I. Evaluation of the extent and nature of the problem 1

II. Research and health education 2

III. Case-finding 3

IV. Medical care, isolation, and after care 4

A. Problems of the tuberculous patient 4

B. Functions of medical social service 6

V. Rehabilitation 11

A. Social, emotional, and economic aspects of rehabilitation 12

B. Vocational aspects of rehabilitation 13

C. Rehabilitation services for persons with infectious chronic tuberculosis ... 14

VI. Protection of the tuberculous patient and his family against economic distress 15

Appendix:

Section 1: Training and recruiting medical social work personnel 17

Section 2: Essential elements in education for medical social work in a professional school of social work 18

Section 3: Schools of social work with a curriculum in medical-social work approved by the American Association of Medical-Social Workers ... 20

The tuberculosis patient requires expert assistance in resolving social and economic problems created by his illness. Upon the medical social worker falls much of the burden of securing emotional and economic adjustment to tuberculosis for the patient and his family. The effectiveness of other control measures is lessened unless this primary adjustment is made. Medical social service is an integral part of successful tuberculosis control, and as such merits a leading role in the development of local, State, and national programs for the eradication of this disease.

THOMAS PARRAN,
Surgeon General.

MEDICAL SOCIAL SERVICE IN TUBERCULOSIS CONTROL

In terms of public health and national economy, tuberculosis is a destructive community disease, because of the loss of physical well being, the insecurity and unhappiness that it brings.

It has long been recognized that any illness has a social component, but so far no national program based upon long-range planning has been developed for the treatment of the social problems that are inherent in every case of tuberculosis.

Any comprehensive plan for the control of tuberculosis must include, along with medical care, the treatment of social ills. Because of a full recognition of this need, the Tuberculosis Control Division of the United States Public Health Service is now formulating a plan for medical social service which will be an integral part of the broad program of tuberculosis control. To assist in this new undertaking, an advisory committee of medical social workers was requested of and generously provided by the American Association of Medical Social Workers in October 1945. The Tuberculosis Control Division values this professional assistance.

The following report resulting from the first meeting of the Advisory Committee, defines the functions of the medical social worker as they are related to the main objectives of a tuberculosis control program. These objectives are:

1. Evaluation of the extent and nature of the problem in each community;
2. Research and health education;
3. Case finding;
4. Medical care, isolation, and after care;
5. Rehabilitation;
6. Protection of the tuberculous family against economic distress.

In addition, in an appendix, there are statements concerning the basic educational and experience requirements for medical social work personnel and a list of schools of social work which offer approved curricula in medical social work.

This manuscript was organized and prepared by the Medical Social Service Unit, Office of the Chief, Tuberculosis Control Division, United States Public Health Service.

It is hoped that these principles, as defined by a committee of outstanding medical social workers and endorsed by the Tuberculosis Control Division, will provide a sound basis for the rapid development of a much-needed program of medical social service in all fields of tuberculosis control through grants-in-aid funds to State and local health agencies.

HERMAN E. HILLEBOE, *Medical Director,*
Chief, Tuberculosis Control Division,
United States Public Health Service.

APRIL 15, 1946.

INTRODUCTION

Medical social service is a special field within the social work profession which has developed over the past forty years in relation to the practice of medicine in hospitals, clinics, departments of public health, and other organized programs of medical care. A broad concept of medical care has long included treatment of physical illness as well as treatment of social factors that influence the effectiveness of medical care, contribute to the degree and duration of the disability, and help determine the ultimate adjustment of the individual. There is an increasing emphasis in medical practice on the preventive approach and on the social and community aspects of health.

The functions of the medical social worker are:

a. To practice medical social case work—
   1. Through study of social, economic, and emotional factors which reveal the patient's readiness and ability to carry out the recommendations for medical care;
   2. Through evaluation of these factors as they affect the capacity of the patient and his family to adjust to the medical situation;
   3. Through dealing with social, economic and emotional factors which may affect the patient's ability to gain full benefits of medical care and reach the best possible state of health and well-being.

b. To serve as medical social consultant, bringing to cooperating health agencies an increased knowledge of the social aspects and to welfare agencies an interpretation of the significance of illness and medical treatment as these affect plans of medical and social care.

c. To participate in community planning for health and welfare.

d. To share with other staff members of the health agency, responsibility for participation in the orientation and in-service training programs for professional personnel.

e. To participate in the education and training of students in schools of medicine, public health, nursing, and social work, and to supervise medical social students assigned to the agency for field work practice.

f. To participate in research concerned with understanding the relationship of economic, social and emotional factors to ill health.

The medical social worker is qualified to render these services because of the knowledge and skill developed through specialized professional education and experience. Schools of social work with approved medical social curricula require two post-graduate years of professional education leading to the degree of master of arts.

The medical social worker's knowledge regarding health and disease, her understanding of the role of the emotions and the meaning of behavior in illness, her understanding of the relationship and influence of economic and social factors on ill health and disability, and her ability to utilize the services of those community resources best suited to the needs of the particular individual and his family, are all basic in dealing with social problems related to illness.

Under the leadership of the physician, the medical social worker func-

tions in continuous association with the other professional personnel in the medical and health agency. She is a member of a team composed of the doctor, the nurse, the nutritionist, and others concerned with the care of the sick. Responsibility for recognizing and considering the social aspects of illness is shared by all members of the team but the medical social worker has the primary responsibility in this respect because of her specialized training and experience. She can give help to other staff members by increasing their understanding of social factors which affect the medical, nursing, or other care which is their primary concern.

In the field of tuberculosis control, the functions of the medical social worker are those previously described. The specific methods, as related to the problem of tuberculosis, are discussed in the succeeding material.

American Association of Medical Social Workers' Advisory Committee

Tuberculosis Control Division
United States Public Health Service

Miss Zdenka Buben, *Chairman*,	Los Angeles, Calif.
Miss Helen J. Almy,	Boston, Mass.
Miss Metta Bean,	Milwaukee, Wis.
Miss Sophia Bloom,	New York, N. Y.
Miss Kate McMahon,	Boston, Mass.
Mrs. Marie L. Novak,	Chicago, Ill.
Mrs. Ruth B. Taylor,	Chicago, Ill.

Miss Edith M. Baker, Director of Medical Social Work Unit, Division of Health Services, Children's Bureau, United States Department of Labor, Washington, D.C. (Ex officio.)

Miss Eleanor Criger, Medical Social Consultant, Tuberculosis Control Division, United States Public Health Service, Washington, D.C. (Ex officio.)

EVALUATION OF THE EXTENT AND NATURE OF THE PROBLEM

The medical social worker recognizes, as a first step in tuberculosis control, the importance of measuring and evaluating the extent of the problem in a community by using all available statistical and other informative material. Her contribution is to bring out the social significance in the material by adding specific information concerning personal situations and community problems that are revealed through case work study. A few of the many examples that illustrate the manner in which this contribution can be made are as follows:

The index of the average per capita income for individual States does not give a picture of the income of particular families in relation to the costs of living or the standards of living, nor does it follow that the States with the highest per capita income have the best resources for health and welfare.

A compilation of figures that shows the availability of beds in a given State does not point out the correlation of beds to the needs in any given area, nor does it show the number of empty beds in one community and the long waiting lists in another. The medical social worker, through her work with the individual patient, can help to point out these local gaps in resources for the State as a whole.

A mere statement of the number of beds in any institution and the utilization of beds does not give an accurate picture of the inadequacies in a given program. Through recurrent experiences with dissatisfied patients, the medical social worker can offer revealing information concerning inadequate medical care, discriminatory practices, or poor food.

The medical social worker may also point out the need for new resources in a community. For example, through her experience with a group of patients with chronic tuberculosis who have limited working capacities, she is faced with the need for providing some type of part-time work or sheltered employment. Out of this experience she may be instrumental in helping the community establish a community workshop.

The medical social worker has particular responsibility for augmenting the list of medical and social resources in a community. The data would include—

1. The possibility of increasing relief grants on the basis of medical need;
2. The possibility of developing a foster home program for children with special needs;
3. Policies relating to the acceptance of nonresidents for various types of service;

4. Methods to be used in applying for care and the information necessary for each agency to make a decision as to acceptance for service.

Such data are not static but have to be revised constantly in light of increased or decreased provision for service or changes in policies.

All such study material can be used by appropriate groups to improve existing facilities or to increase resources and programs for the tuberculous and their families.

RESEARCH AND HEALTH EDUCATION

Effective preventive and remedial methods in tuberculosis control are constantly being improved through research and strengthened by increased health education. Therefore both research and health education are activities found in the other areas of tuberculosis control, such as case finding; medical care, isolation, and after care; rehabilitation; and relief from economic distress.

Research.—Medical social workers can function effectively in medical social research related to community health and medical care programs.

Some typical studies would include:

1. A study of "intake policies" of sanatoria as these affect the tuberculosis control program of the community.
2. A study of underlying causes which motivate tuberculous patients to leave sanatoria against medical advice.
3. A medical social study of the problems of the tuberculous transient.
4. Economic, social and emotional insecurity as contributing causes to the reactivation of tuberculosis.

Some typical medical social research locales would be:

1. Projects undertaken by the health agencies in which medical social service is a part of the program.
2. Research departments of Federal, State, and local health and welfare agencies.
3. Research departments of Councils of Social Agencies which accept responsibility for analysis of community health programs as a fact-finding process preliminary to developing plans to meet health service needs.
4. Graduate schools of social work in which students undertake medical social studies.

In addition, as a continuous byproduct of the daily activities of medical social workers there is cumulative evidence of problems requiring further exploration. The findings frequently offer a sound basis for community planning and social action.

Health Education.—The medical social worker has no primary responsibility in health education, but rather she enables patients to utilize its benefits.

In addition, in her daily case work practice, the medical social worker will gain insight into the patient's understanding of his illness and his possible resistance to the application of the principles of personal hygiene. She may perceive the inadequacies in home sanitation and ways in which

the patient and his family, or groups of patients, are utilizing opportunities for disease prevention and health promotion by community health facilities. By referring these circumstances to the public health nurse and health educators, the medical social worker makes an indirect contribution to health education.

CASE FINDING

Case finding has been defined as a program of mass and individual examinations for the purpose of discovering unsuspected tuberculosis. Two methods are in general use at the present time: first, radiographic studies of cross sections of the population; and second, family epidemiological surveys. The former type includes a wide variety of groups—social, industrial, racial, age, and geographical. The latter is concerned primarily with contacts of previously diagnosed cases of tuberculosis.

The settings in which these studies are made vary among or within different communities and, to some extent, determine the role played by the medical social worker. The examining agent may be a private physician, a unit of the health department, the tuberculosis association, a clinic, a hospital, or some other organized medical care program.

Case finding is a primary function of the public health nurse. However, it is agreed that when potential sources of infection and contacts resist necessary examination, the public health nurse will refer such patients to the medical social worker, either on a consultant basis, or for intensive social study and possible social care.

Specifically, the functions of the medical social worker in a case-finding program are as follows:

1. To assist the physician and the public health nurse *on referral*, in problems concerned with follow-up of the suspected or diagnosed case and in bringing in contacts.
2. To explore and evaluate attitudes, social complications, and other factors which affect adversely the patient's ability or readiness to follow recommendations for diagnostic procedures and medical treatment.
3. To help the patient, directly or indirectly, to work through his difficulties and to utilize constructively the resources available for meeting his needs.

In some settings no medical social worker is as yet on the staff; in such instances, the public health nurse will assume some of this worker's activities. In other agencies, such as voluntary clinics and hospitals, no public health nurse may be available at the present time and the medical social worker will extend her services to include interpretation of medical recommendations, health education, and follow-up in addition to her case-work functions. For some time, because of limitations of personnel in both groups, public health nurses and medical social workers, necessarily will have to continue to assume some of each other's activities, when only one skill is available. However, in general, each professional person will recognize those activities which are, by education and experience, the

valid functions of the other. A statement which will clarify the division of responsibility between these respective workers in tuberculosis control programs is in the process of being drawn up jointly by representatives of the National Organization for Public Health Nursing and the American Association of Medical Social Workers.

A case-finding program is successful or unsuccessful according to the efficiency of its case holding. The effectiveness of the medical social worker's contribution in case-finding programs will often be determined by the frequency with which she is consulted. The earlier and the more numerous the referrals, the greater will be her opportunity for a careful evaluation of the factors which are causing a medical social problem and the more likelihood there will be of a greater number of better adjusted and willingly cooperative patients during the subsequent treatment period. Some of the specific social and emotional problems encountered among this diagnostic group of patients are discussed in the following section.

MEDICAL CARE, ISOLATION, AND AFTER CARE

"The cure of tuberculosis depends more on what the patient has in his head than on what he has in his chest."

—Dr. William Osler.

It is an accepted fact that tuberculosis is one of the diseases in which body and mind must be treated simultaneously in order to insure the most effective results. The medical social worker assists the physician and the nurse to obtain an understanding of the patient as a person, in terms of his total needs and those of his family, so that a well-rounded plan can be made which will insure maximum benefits from medical care.

A. Problems of the tuberculous patient

The problems which patients present during the period of medical treatment are many and varied. They will be briefly described in this section as they relate to the functions of the medical social worker. For the purpose of this discussion they have been grouped into three major classifications: emotional, economic, and social.

1. Emotional needs

The problems most frequently encountered in the tuberculous patient, and those which demand the most skillful handling on the part of the medical social worker, are emotional. At the time that the patient is told he has the disease, the diagnosis of tuberculosis is often a great emotional shock, and this reaction may or may not diminish as medical care is given. The actual treatment may in itself contribute additional fears, and the isolation of the patient from his family and normal environment may aggravate his already greatly disturbed state. These attitudes are important not only because they influence the patient's acceptance of medical

treatment, but also because they can actually affect the progress of the disease.

Fear is not the only response encountered, but is so universal that it requires special consideration. Some of the frequent fear anxieties are as follows:

A. *Fear of the disease.*—Its ultimate outcome, the possibility of death, the treatment administered, particularly surgery and its disabling effects; the danger of becoming physically, economically, and emotionally impotent and dependent; the cost of long-time medical care, stigma, and the realization that other members of the family may have become infected; inability to accept the prescribed medical regime which requires restriction of activity, removal from all close associates, loss of privacy and submission to a medical authority.

B. *Social fears.*—Loss of status in the home and in the community as a wage earner or career person; fear of the inability to maintain the home in regard to finances and care and supervision of the children; marital infidelity and the complicated problem of sexual relationships, including the possible inadvisability of having children; loneliness and boredom.

These emotional patterns may be complicated by well intentioned but often unsound advice of relatives and friends, by tradition, superstition, and cultural patterns that influence the patient's attitude toward his disease, and by philosophies, religious or otherwise, that sometimes create unhealthy indifference to the diagnosis and the medical care program.

2. Economic needs

Economic needs are one of the major causative factors in the emotional distress. They are more easily treated because they are less subtle and more tangible; they are, however, serious and the adequacy of the handling is dependent upon the resources within the patient's own family, the community, plus the social case worker's skill and the patient's ability to accept assistance. Because of the magnitude of this problem it is being treated in a separate section, "Protection of the Tuberculous Family Against Economic Distress."

3. Social needs

Social needs are difficult to isolate from the foregoing groups as all of these situations have certain social aspects. For purposes of this discussion, however, the term includes the environmental phases of the patient's situation, and is specifically concerned with questions of family problems and legal aspects.

(*a*) Family problems:

1. The attitude of members of the family toward the tuberculous patient, since this may require considerable explanation of his needs and limitations, and some help because of the fear of contracting the disease.
2. Housing has significance as a contributing factor in the spread and unfavorable progress of the disease. Lack of sanitation or reasonable comfort, over-crowding, inadequate facilities for isolation and rest for the non-hospitalized patient, are some of the difficulties encountered in the majority of cases.

3. Problems related to the care of children in need of placement or housekeeping services.
4. Visits to the patient in the sanatorium and of the patient to the home frequently involving some activity on the part of the medical social worker to interpret certain restrictions both in relation to the regulations, and in providing the necessary transportation.
5. Discharge problems for which the medical social worker must plan ahead with the family and the patient in order that he may have a satisfactory environment to which he can safely return with no danger of reinfection or the possibility of a breakdown.

(*b*) Legal aspects:

There are legal problems occasioned by the fact that "nonresidents" are not accepted for care in most communities. The nonresident who has a legal residence elsewhere, and the person who has lost his residence in both the place in which he is living and the place which he left, are seriously disadvantaged. These circumstances should be given early consideration, because many communities are adamant in their position with regard to responsibilities for their own residents only and many public institutions accept only residents of a given political subdivision. Since tuberculosis does not respect geographical boundaries, limitation of service on the basis of legal residence is impracticable. Federal assistance has often been suggested for persons without legal residence. In addition, because tuberculosis is a communicable disease, there are many public health laws which restrict infectious tuberculous persons as free agents. When the patients own desires and conduct conflicts with the welfare of others, he will need help in facing the reality of such legal implications and in accepting them as having validity from the point of view of society as a whole.

B. Functions of medical social service

The medical social worker can give two types of service:

1. Consultation service to other professional persons who are assisting the patient.
2. Direct case-work service to the tuberculous patient.

In either type of service the medical social worker will have related responsibilities in terms of administration, education, community organization, and social action.

1. Health departments

Many of the medical social workers employed on the staffs of State and district health departments are called consultants, a term which seems truly descriptive of their primary function. The medical social consultant on a State or district staff does not duplicate the services of social workers in State or local welfare departments, sanatoria social workers, or of public health nurses and other personnel on the health department staff. As a specialist in social problems related to health and medical care, she provides consultant services to all these workers on individual and community problems that interfere with the effectiveness of health services. Through her liaison activities with sanatoria social service departments and social agencies, she strengthens the integration of health and welfare services. She may interview patients and family members in the health

department clinics in order to discover and evaluate social aspects in individual situations.

In communities where no social agency is able to provide the service which the patient needs, the medical social consultant may provide these services herself, as a temporary measure, to supplement the activities of the community. At present, in some rural areas, there is great need for these supplementary services. The extent of the services of the medical social consultant and the way in which she operates in any community depend upon local needs and the availability and adequacy of local services. The necessity to provide direct service decreases with the development of increased social services by sanatoria and convalescent homes, local welfare departments, and other types of public and private community agencies. Local responsibility for health and welfare services to individuals is generally accepted and we know that local participation and responsibility are essential in the development of stable, permanent services.

The patient's acceptance of the diagnosis and treatment recommendations is not enough in itself, if he is unable to obtain medical care through his own resources. In some communities he must seek help in obtaining care from health and welfare agencies. The agencies to which he turns must also have understanding and acceptance of the recommendations. Medical social consultants have been of service with such problems through participation in conferences between public health nurses and supervisory workers in welfare departments.

The medical social consultant can also be of assistance in strengthening the working relationships between sanatoria and local health and welfare agencies. Often this service includes the development of plans for the prompt exchange of medical and social information and for joint planning between the sanatoria and community agencies. In addition, medical social consultants in State health department programs have helped sanatoria administrators establish social service departments or have been instrumental in bringing about extension and improvement of these services.

The medical social consultant's services are being utilized increasingly by public health nurses in group discussions and individual conferences. The medical social consultant is asked by the public health nurse to visit a family to secure a better understanding of the social problems before giving consultation. After this, the medical social consultant and the nurse decide upon the next step. In some situations the nurse continues to carry responsibilities for helping the patient, either alone or in cooperation with a local social agency. In other instances it may be decided that the medical social consultant is to assist the nurse further, through consultation or by giving services directly to the patient. Whenever two or more members of the medical team, such as doctor, public health nurse, and medical social worker, are concerned with the social situation in the

same case, they must agree among themselves, by conference, what responsibility each will carry.

In some official tuberculosis control programs the medical social consultant will be the only social worker in the health department. In other State health agencies where medical social consultants are already employed in other divisions (e. g. crippled children, maternity and child health, and rheumatic fever programs) medical social services in tuberculosis control divisions should be carefully planned to correlate with medical social services already being provided. A chief medical social consultant should be given the responsibility for the direction and technical supervision of all medical social work in the agency, including the selection and assignment of other consultants or workers, and the development of service in collaboration with division directors. The chief consultant and the other members of the medical social service staff would then cover the State on a geographic basis. They would have responsibility for all medical social services in specified areas and would provide consultant service to local personnel in any program of the health department in which these services are requested. This generalized basis for service is in accordance with accepted principles of public health administration.

2. In tuberculosis clinics

In a public health clinic the medical social worker can serve either as a consultant to the other professional members of the staff, or, by agreement through conference with the physician and the public health nurse, assume a direct case work responsibility.

Generally, the major function of the medical social consultant or worker will be to discover, evaluate, and assist in the solution of the emotional, economic and other social factors which hinder the patient in adjusting to his medical problem.

Specifically, she will assist the physician and public health nurse in the following ways:

1. By evaluating and dealing with the patient's attitude toward his diagnosis and recommended treatment plan.
2. By determining the patient's eligibility for available treatment resources.
3. By interpreting to him the procedures and policies to be followed in securing services through these resources.
4. By assisting the patient to work through any social complication which interferes with the plan for treatment.
5. By helping the members of the patient's family accept the medical recommendations and by giving them the assistance they may need in regard to the solution of their own problems.
6. By establishing a supportive relationship which will help sustain the patient and his family throughout the period of medical care.

Additional specific functions of the medical social worker in a public health clinic with regard to patients discharged from the sanatorium are as follows:

1. To re-evaluate the total social situation in light of the patient's current medical needs and recommendations for further care—a social diagnosis which will include not only the present environmental and emotional factors but also significant changes or trends.
2. To bring to the attention of the physician and public health nurse any significant changes in the patient's social situation and to learn from them of any changes in the medical status or recommendations, so that there will be joint planning periodically on the basis of the patient's medical and social adjustment.
3. To assist the physician and the nurse in helping the patient and his family understand the patient's present condition so that there will be no overprotection nor undue demands.

Referral to the medical social worker is possible at anytime. Mutual agreement among physician, public health nurse, and medical social worker as to the part each will play in the plan of treatment can be readily made when the medical social worker enters the case immediately following the diagnosis and recommendations for care. When the case is referred for social study and case work service after the medical plan has already been agreed upon, there is an inevitable risk of blurring of function and overlapping of activities of the public health nurse and the medical social worker. This is readily understandable, if one considers that both are working with the same patient and the same medical social problem. This can be avoided to a large degree, however, if the reason for referring the case to the medical social worker is understood and accepted by the three professional persons concerned.

Reasons for referral to the medical social worker needs be consciously thought through and clearly stated. Once the study of the patient's problem has been completed, the medical team determines the division of responsibility for further service. Invariably the physician is responsible for the total plan of medical care. So far as division of responsibility between public health nurse and medical social worker is concerned, the plan may follow one of three patterns:

1. When the health problem is paramount, the public health nurse should carry the major responsibility, and the medical social worker should serve only as needed in a consultant relationship for the social aspects of service.
2. A problem with serious health and social aspects calling for the special skills of both public health nurse and medical social worker, should be carried cooperatively.
3. When the social situation assumes major proportions, responsibility for social study and care should be assigned to the medical social worker.

3. In the tuberculosis sanatorium

The day-to-day life of the patient in a sanatorium can produce much strain and tension. Personality conflicts, the loss of privacy, institutional food, the interfering needs of other patients combined with the patient's own fears, superstitions, cultural traditions, his sense of personal inferiority, and his need to repress sexual desires are some of the contributing factors to a highly charged atmosphere in which the patient must live. Because of the complexity of institutional problems, a medical social

69?533°—46—2

worker in a sanatorium can be of great assistance to the tuberculous patient.

In addition to offering a social case work service to the patient population, she can bring to other staff members and students a broader concept of the social aspects of tuberculosis. However, in order to carry these responsibilities, an adequate number of medical social workers will be needed within the institution—at least one for every 50 to 75 patients.

At the time of admission to the sanatorium, the patient often is unable to make an immediate adjustment to institutional life. Serious social problems, which often develop at this point, can be prevented through the physician's use of the medical social worker in two ways:

1. To assist the patient in the adjustment to his new life.
2. To make a social evaluation of all new cases, in order to help the physician understand the individual patient and his ability to adjust to the treatment plan.

Crises of various descriptions tend to occur during some period of the patient's stay in the sanatorium. They may take the form of emotional upsets, conflicts with other members of the staff or other patients, disciplinary problems, or discharges against medical advice. It is important that a crisis should not be reached. It is an essential part of the medical social worker's function to discover these situations and to help the patient with his difficulties so that he will not become a problem to the sanatorium staff or leave the sanatorium against medical advice.

The physician usually asks the medical social worker's help in dealing with such problems as the following:

1. Patients who wish to sign out against medical advice.
2. Patients who show behavior problems and who are in conflict with other patients, members of the staff, or hospital regulations.
3. Patients who are worried about family problems such as marital difficulties, care of children, and financial difficulties.
4. Patients who refuse treatment, such as surgery or pneumothorax, probably due to fear.
5. Patients who have physical symptoms, with no physical basis, which are likely to be emotional in origin.
6. Patients who fail to progress and show signs of depression, uneasiness, and anxiety.
7. Patients who are physically ready for discharge but emotionally are unable to face the realities of community life.
8. Patients who are to be discharged for the purpose of assisting them in making adequate plans for community living.

In addition to referrals from the physicians, the medical social worker may receive requests for service from other sources, such as:

1. Requests from nurses and other staff members asking for some specific type of service for the patient.
2. Requests from patients which may involve very minor to very complicated personal problems.
3. Requests from patients' families which may be for some type of service for the patient or for themselves.

4. Requests from other medical and social agencies which are also interested in the patient and his problems.

The medical social worker will evaluate each situation with respect to the patient's need for her services, as follows:

1. Patients for whom no service seems indicated at the present time.
2. Patients for whom some temporary or short-time service is indicated.
3. Patients for whom an intensive service is required which may extend over a long period of time.

In order to synchronize the activities of the physician, nurse, medical social worker, and other persons interested in the care of the sanatorium patient, a weekly staff conference is recommended. For such mutual consideration and planning, the following kinds of situations are suggested:

1. Analysis of the medical and social needs of each new patient and the formulation of a cooperative plan to meet these needs.
2. Periodic re-evaluation of the patient's medical and social situation and, as necessary, the formulation of new plans for service.
3. Determination of the patient's readiness for referral to the vocational counsellor.
4. Early consideration of ways in which staff members can assist the patient with plans for discharge.

The medical social worker's presence on the ward-round's staff—another valuable method of synchronizing staff activities—often helps the patient to understand and accept the inter-relationship between his medical and social situation. It also enables the medical social worker to see new attitudes of the patient in his relation to the medical staff; to offer social interpretation to the physician which may throw additional light on a problem situation; to allay some of the patient's fears; and to keep herself informed of the medical aspects of treatment.

The problems of the tuberculosis patient and his family, during medical care, isolation, and after care, have been discussed in terms of emotional, economic, and other social implications. The functions of the medical social worker have been described in both the preventive and remedial aspects. Medical social services may be given through consultation, through a direct case work service, or through a combination of both. The medical social worker functions in health departments, clinics, sanatoria and hospitals. In any setting her principle concern is the individual care of the patient and the help which she can give him in working through his medical-social problems. In this way, the medical social worker makes a valuable contribution to treatment and rehabilitation.

REHABILITATION

Rehabilitation is an integral part of the treatment of the tuberculous patient; its goal is the restoration of the patient to the fullest physical, mental, social, vocational, and economic usefulness of which he is capable. The process of rehabilitation begins at the point of diagnosis and is continuous throughout medical care.

Rehabilitation is a teamwork job in which several professions participate, but not necessarily all at the same time. The leader of the team is the physician and all other services are based on his diagnosis and recommendations. Among the important members of the team are the nurse, medical social worker, occupational therapist, rehabilitation counselor, teacher, and many others who are concerned with the patient in the institution. At times, representatives of outside agencies may participate in the process. The medical social worker, an essential member of this team, assumes responsibility for the social aspects of service.

This section will deal with that part of the rehabilitation process which is concerned with the preparation of the patient for his return to the community and with his adjustment after discharge.

A. Social, emotional, and economic aspects of rehabilitation

All the social services previously discussed in relation to the social, emotional, and economic needs of the patient may be given by the medical social worker as part of the rehabilitation process. Her share in this process includes the following:

1. She will help with social aspects of the problems which retard recovery and block the full rehabilitation process, recognizing that these problems may occur before, during, or after the vocational program has begun.
2. She can prepare the patient for the vocational referral by interpreting these services to the patient and his family.
3. In the convalescent period and as the time of discharge from the sanatorium approaches, she can help the patient overcome his anxieties created by leaving the familiar environment of the institution.
4. She will utilize community resources to relieve financial or social difficulties, which may interfere with the training program. These difficulties may arise as a result of inadequate income or such problems as reestablishment of the home, care of children, housekeeping service, supplementary diets, and other complications, Financial security is particularly important for the patient and his family during the period when work tolerance is being built up and only part-time employment is possible.
5. Her services may include helping the patient to accept a job which is less satisfying economically and from the standpoint of social status than his former one, and of winning the family's understanding of this necessity. The fear of losing his place in the family group or in the community may lie back of refusal of a job otherwise appropriate and well suited to the patient's limited capacity.
6. She may be called upon to assist the patient with problems regarding his subsequent medical care as well as his adjustment to his environment.
7. She can assist with follow-up problems which may develop because of attitudes or other special complications in the patient's situation.

The duration of the after-care period has been considered to include the 6-year period after discharge. Some of the problems which occur at the time of diagnosis and during the sanatorium period will carry over into the post sanatorium period. Most frequent are the fears and anxieties regarding the disease, particularly the danger of its recurrence, of the possibility of financial dependency; anxieties over attitudes of friends,

relatives, and employers, and concern over accepting the normal family responsibilities after the protected environment of the medical institution.

B. Vocational aspects of rehabilitation

The decision as to vocational referral and the appropriate time for the referral are dependent on many factors which require joint consideration by the team. The medical social worker contributes in these ways:

1. She brings to the other members of the team the information which she has gained in her interviews with the patient regarding his background, his family, his attitude toward his disease, his previous work interests and achievements.
2. She is in a position to know which patients are ready, socially and emotionally, for vocational service. Some will be able to return to their former occupation; others may return to their households and assume these duties. Some in this group who are medically able to leave the sanatorium are not ready emotionally to accept the fact that they can return to their normal environment and to some type of occupation.

The patients who will come within the vocational training program will be those who presumably will be able to resume their normal or partially restricted activities in the post sanatorium period. Other types of rehabilitation services may also be offered to many patients who, because of the progress of the disease or because of age or mentality, must be excluded from the training program. Without teamwork among the various professions who advise the patient about his future plans, confusion will result.

A staff conference under the leadership of the physician enables each member of the team to make his particular contribution in developing the plan for the individual patient. This type of group discussion is a prerequisite for any vocational referral, which may take different forms: in-training, education, or re-training while the patient is in the sanatorium or after he is discharged, or assistance in job placement.

Those who plan rehabilitation services are confronted with two major problems, namely, the attitude of industry toward employment of tuberculous patients and the complications arising from the policies of insurance companies. The solution of these problems is not within the scope of medical social service. The medical social worker may, however, be able to assist in individual instances by explaining the patient situation to employers and others. Many former tuberculous patients have found employment during the war, on a part-time or full-time basis. This is evidence of the influence on this problem of the fluctuations of the labor market. There are hopeful signs that employers and the United States Employment Service will join with health officials and others to find an answer to the employment needs of the tuberculous person.

C. Rehabilitation services for persons with infectious chronic tuberculosis

The types of planning thus far discussed refer especially to the person whose disease is arrested and who is physically able to resume his normal activities and assume his place in society. Persons with chronic infectious tuberculosis; that is, those with persistent bacteriologically positive sputum need a somewhat different type of planning. Some may have a partial working capacity and others none, but they have been discharged because of having received the maximum benefit of treatment from the given institution.

1. Patients able to work:
   In addition to the difficulties already noted in the group with arrested disease, another problem for this patient is the lack of resources for job placement because of infectivity and limited working capacity. Supplemental financial assistance is usually a necessity, not only because of the budgetary requirements, but also because the patient must not feel himself a burden. It is the medical social worker's responsibility to assist in providing some resources for his vocational needs. Present facilities are most inadequate, because there are too few sheltered workshops and homebound programs. More facilities need to be developed and the possibilities of enlisting the cooperation of industry in protected work for this group need to be further explored.
2. Persons unable to work:
   For this group the problem is even more serious. The patient has to be accepted as a physically dependent person. This is the group for whom often there must be either long-time financial help in the community or provision for custodial care. The patient needs to be isolated; and he has all the attendant anxieties accentuated by his poor prognosis. There is need for constant understanding on the part of the family to reassure the patient. There is need for recreational outlets, diversional therapy. There are other family problems when illness changes the pattern of the normal home; as when the man is the patient and the wife must go to work or the children support him; or when the mother is the invalid and a housekeeper has to be employed.

Public health officials and all who are concerned with the rehabilitation of the tuberculous are aware of the importance of the total rehabilitation process and recognize that this process is effective only when there is mutual understanding of the contribution which each member of the team makes toward the fulfillment of the patient's rehabilitation needs. Rehabilitation service must provide for the patient and his family the fullest possible life in terms of physical and mental health, some form of work or occupation, and social outlets. The human and economic waste which results when the benefits of sanatorium care are nullified by inadequate rehabilitation services are frequently emphasized. For those in the tuberculous population, for whom rehabilitation services are necessary, the real value lies in the lessening of the impact of the disease on the individual and his family and in restoring him to his place in society. Every tuberculous patient restored adds to the continuity of family life, and enriches the community. These factors are new ways by which to measure the effectiveness of tuberculosis control programs.

PROTECTION OF THE TUBERCULOUS PATIENT AND HIS FAMILY AGAINST ECONOMIC DISTRESS

Economic problems are indigenous to the problem of tuberculosis. The patient's loss of earning power creates a financial drain on the community in terms of medical care and dependency. This financial insecurity and dependency are even more important for the patient and his family. Financial problems are, in reality, specific causative factors which increase the incidence of tuberculosis. Inadequate food; improper living conditions; and the debilitating effects of constant worry and emotional strain can directly, or indirectly, produce tuberculous patients.

Some of the general economic problems include:

1. Loss of income because of the illness of the wage earner.
2. Cost of long-time and expensive medical care.
3. Increased drains on the family's resources to provide adequate care for the children in the absence of the mother.
4. Loss of financial assets, such as homes, businesses, savings, and insurance.

Tuberculosis is especially prevalent among persons who are the most economically productive and who bear and rear children. The significance of the disease is increased by patient's fear of losing his independence and status in the community and in the home; the possibility that he will be unable to return to his former type of employment or to do any work at all; the effect of lowered standards of living; and the meaning of these possibilities in terms of the patient's family.

The resources for medical care and public and private assistance vary markedly among States and among communities within each State. Only a few areas have met this problem with any degree of effectiveness.

Present inadequacies in medical care include an insufficient number of beds and restrictive eligibility requirements concerning residence, race, and financial ability to pay for care. Many communities still do not provide free diagnosis and treatment. However, there is a growing realization that this plan is economically unsound and that the means test is a barrier to effective tuberculosis control.

There are three accepted patterns of economic aid, namely: public assistance, general relief, and the social insurances. Funds for public assistance usually come from federal grants-in-aid which are matched by State funds. Funds for general relief may come from State and local funds; or entirely from either State or local funds. In addition to the means test and other restrictive eligibility policies, the actual public assistance and general relief grants are frequently insufficient to maintain adequate standards of living which will prevent further physical and social breakdown. In the social insurance programs the means test is omitted. A person accepts insurance payments as a right due him as a wage earner who has participated in the insurance plan. Social insurance programs, unfortunately, do not as yet provide total coverage of all the people and a disability insurance program has not yet been formulated.

The medical social worker is concerned with the broad problems involved in the economic distress of the tuberculous, because these problems directly reflect the economic needs of the individual patient and his family. Through either a consultant or direct case work service, the medical social worker has continuous opportunity to gather evidence of the economic pressures upon the tuberculous patient and their effect upon him, his family and the community. She can bring these data to the attention of administrators and to interested lay and professional groups so that they will be a basis for social action which will secure adequate and stable economic protection.

The following illustrations will show ways in which the medical social worker can be of direct assistance in protecting the individual patient and his family against economic distress:

1. Assisting the patient and his family to work out a satisfactory plan of medical care within the family means.
2. Helping the patient to decide what to do about insurance policies, payments on home and furniture, continuing a business, and other related problems.
3. Helping the patient or his family to consider the desirability of applying for public assistance, general relief, or some other type of financial aid to supplement the family income and to refer those who wish to apply to the appropriate social agency.
4. Offering a liaison service between the medical agency and other cooperating social agencies concerned with the welfare of patient and family.
5. Arranging employment of an assistant in the home, such as "home worker" service.
6. Arranging allowances for special diets, prescriptions, medical supplies, and other essential supplementary care or comforts.
7. Arranging for necessary transportation to bring the patient to or from the sanatorium, and to assure a sufficient number of visitors to maintain the patient's morale.

The medical social worker will function in relation to other social agencies. Her activity will consist in helping the patient to choose the appropriate resource to meet his needs, preparing the patient and the agency for the referral, and in assisting the health and welfare agencies to work out a division of cooperative responsibility to the patient.

In spite of individual or combined efforts, the present inadequacies in public assistance, general relief, and the social insurances, often preclude a really sound plan for the patient, his family, and the community. Measures most often advocated to relieve this situation are grants-in-aid for the tuberculous as a group, Federal disability insurance, or a combination of both. Medical social workers have an important contribution to make toward broader social planning and they can effectively help in the social action necessary to bring such plans into being. Because of the essential relationship between tuberculosis and economic insecurity, effective tuberculosis control cannot be achieved so long as society fails to provide adequate economic security for the disabled.

APPENDIX

Section 1

Training and Recruiting Medical Social Work Personnel

Surgeon General Thomas Parran has said: "The success of public health programs is dependent to a large extent upon the employment of competent and professionally trained personnel."

In this appendix will be found an outline concerning the essential elements in education for medical social work in a professional school of social work, and a list of schools offering an approved course in medical social work. To date, 17 of the 45 member schools of the American Association of Schools of Social Work have developed an approved medical social curriculum.

The shortage of competent medical social workers existent before 1941 was accentuated by war needs. Even at the present time medical social graduates, roughly two hundred each year, are not enough to meet personnel demands in expanding programs. For example, the Tuberculosis Control Division of the United States Public Health Service will have to give consideration to methods of providing qualified medical social workers.

To increase appreciably the number of students interested in medical social work will require scholarship assistance. Recent experience indicates the advisability of continuing to offer scholarships from public health funds for the second graduate year in medical social work. However, we believe, in addition to the second-year scholarships, a 2-year plan will be necessary to bring students to the schools for the first year.

A joint committee for recruiting purposes was organized at the outbreak of war; it was composed of the members of the five professional organizations in the social work field: American Association of Social Workers, American Association of Schools of Social Work, American Association of Medical Social Workers, American Association of Psychiatric Social Workers, and Association of Group Workers. Public health programs may be able to use this committee in finding suitable candidates for scholarships.

In communities, where conditions are favorable for a good field experience in tuberculosis, the medical social faculty of the school of social work can make use of such facility. However, experience has not indicated that it is necessary or sound to make this procedure a requirement. More emphasis can be placed on tuberculosis in the medical and social curricula given to medical social students in all the schools offering an approved course.

Postgraduate courses are needed for trained and experienced medical social workers who qualify for consultant or supervisory positions. The content of such a postgraduate course might include:

1. Medical and social information specifically related to tuberculosis.

2. Knowledge of the administrative problems involved in Federal-State relationships.
3. Experience in organizing and developing services for tuberculosis control.
4. Acquaintance with the important literature in the field.
5. Observation of selected tuberculosis programs.

In universities of which schools of public health are a part, a semester or two quarters, or even one quarter of special subject matter and experience, drawn from the school of social work and from the school of public health, would give unusual equipment to selected students and provide much needed advanced medical social education.

The urgent need for trained personnel in State health programs is recognized. Medical social workers, however, are concerned with the essential professional safeguards which lie in a planned program for the student throughout the full 2 years of training in medical social work. No adequate substitute for training and experience has been found in this field. In addition, suitable compensation must be given to provide employment incentives.

Section 2

Essential Elements in Education for Medical Social Work in a Professional School of Social Work

AN OUTLINE PREPARED BY THE EDUCATION COMMITTEE OF THE AMERICAN ASSOCIATION OF MEDICAL SOCIAL WORKERS[1]

ADOPTED JANUARY 1943

I

1. The preparation for medical social work is a two-year graduate professional program leading to the Master's Degree in a school of social work which is a member of the American Association of Schools of Social Work. This preparation consists of the basic social work curriculum, as defined by the A.A.S.S.W., and additional related classroom and field work courses in medical work.
2. The main elements in the sequence of courses in medical social work are: specialized subject matter organized in one or more classroom courses; additional related subject matter appearing in other sections of the curriculum; field work; and a research project. The organization of this academic field work; and a research project. The organization of this academic content into courses varies in accordance with the plan in different schools.
3. Classroom instruction:

a. Principles of medical social work:

1. Medical social case work.
2. Social and emotional components in illness and medical care.
3. The medical setting, including the hospital setting and medical care programs covering the community, the State, or the nation.
4. The organization, administration and functioning of a department or division of medical social work.
5. The role of the medical social worker in public medical care programs; consultant and administrative services. (See 3,c.)

[1]This outline is to be regarded as a guide in the development of a sound and balanced program, not as a rating device for evaluating a curriculum.

6. The development of the field of medical social work; history, evolving standards, and interrelationships with other fields.

b. Community organization for health needs:[2]

1. Costs, distribution, and organization of medical care.
2. Administration and standards of medical care.
3. Public and private programs developed under health and welfare auspices.

c. Medical information (advanced):

1. In the form of clinic demonstration rather than lecture, following the general subject matter of the basic medical information course but going further into the scientific and specialized aspects of medicine and relating them to social work concepts.
2. Basic medical information course a prerequisite.

4. Field work.

a. Field experience in medical social work should be given in a hospital or other agency offering medical care.

b. The medical social service departments selected for field work should meet the standards established by the American Association of Medical Social Workers.[3] Further criteria to be met by the department which participates in teaching are: Interest in teaching, qualified student supervisors; and allowance of sufficient time in the supervisor's schedule for adequate planning and performance, including conferences with the student and the medical social instructor in the school.

c. Field work in medical social work covering 400 to 600 clock hours, extending over at least a 6-month period. This should have been preceded by one semester or two quarters of field work in a nonmedical social case-work agency.

5. Research project.

a. The research project which the student undertakes is in general concerned with medical social subject matter or problems of health and medical care. The responsibility for supervision of the project may be carried by the instructor in medical social work in association with the research department of the school or in some other manner determined by the practice in the particular school.

6. Qualifications and responsibilities of the instructor in medical social work.

a. The responsibility for the sequence in medical social work courses should rest with a faculty member who has had valid and authoritative experience in the practice of medical social work.

b. The usual functions of the instructor in medical social work will be as follows:

1. To plan the sequence in medical social work, including the theoretical and field instruction, to integrate its various parts, and to relate them to the needs of individual students.
2. To plan with the medical social service departments selected for field instruction for a field experience that will have educational value and will offer variety and depth in medical social practice. The faculty member has a continuous relationship with those participating in field instruction, in order to relate field practice and theory. It is recognized that the instructor needs to maintain close contact with current practice in order to keep the teaching fresh and vital.
3. To organize and give the technical courses in medical social work.
4. To act as consultant or supervisor for the research project.

---

[2]Much of this subject matter will appear in courses in the general curriculum. The instructor in medical social work has responsibility to deal with it further as it relates specifically to the practice of medical social work.

[3]A Statement of Standards To Be Met by Medical Social Service Department in Hospitals and Clinics, Chicago, 1940. Standards for extra-mural programs have not yet been formulated.

5. To contribute to the total program of the school through giving additional courses in related subject matter and through participation in curriculum planning.

II

1. In addition to responsibility for second-year students who are preparing specifically for medical social work the instructor in medical social work customarily carries responsibility for additional courses in related subject matter, such as the social aspects of medical care of health problems in social case work.
2. Medical and public health information for social workers.[4]
   a. A basic first-year course usually required for all social workers and essential for medical social workers.
   b. The medical social instructor cooperates with the physicians and others responsible for giving this course. Her special contribution is as follows:
      1. Participation in planning and organizing the course as a whole.
      2. Medical social instruction covering:
         a. Social implications of the health content.
         b. Use of medical concepts and resources by the social worker and their integration into social work practice.
      3. Such medical social instruction should be continuous throughout the course and correlated with the medical and public health content, covering approximately one-third of the time.
3. Other courses given by the instructor in medical social work in some schoo's:
   a. Health problems in social case work.
      1. An elective course given as part of the case-work sequence (primarily for nonmedical social workers), making special application of case-work concepts and methods to problems of illness and medical care.
   b. Public organization for health service.
      1. An elective course given as part of the sequence on Public Welfare and administration, covering public and private services for medical care and promotion of health.

[4]See also the detailed outline of this subject matter prepared for the A. A. S. S. W. in 1941.

Section 3

Schools of social work with a curriculum in medical-social work approved by the American Association of Medical-Social Workers

Schools of social work, director, and director of curriculum in medical-social work	Curriculum in medical-social work		
	Originally approved	Discontinued	Reapproved
California			
University of California, Department of Social Welfare (Berkeley): Harry M. Cassidy, Director; (Ruth Cooper, lecturer in social welfare)	1932	1939	1941
University of Southern California, Graduate School of Social Work (Los Angeles): Arlien Johnson, Dean; (Mrs. Elizabeth Payne, associate professor)	1941	.....	.....
District of Columbia			
National Catholic School of Social Service (2400 Nineteenth Street N. W., Washington): Rev. Lucian L. Lauerman, Director: (Mrs. Barbara Bailey Hodges, director of medical-social worker)	1926	.....	.....

Schools of social work, director, and director of curriculum in medical-social work	Curriculum in medical-social work		
	Originally approved	Discontinued	Reapproved
Illinois			
University of Chicago, School of Social Service Administration (Chicago): Helen Wright, Dean; (Dora Goldstine, assistant professor of medical-social work)	1929		
Loyola University, School of Social Work (28 North Franklin Street, Chicago): Roman L. Haremski, Acting Dean	1940	July 1942	
Kentucky			
University of Louisville, Raymond A. Kent School of Social Work (Louisville). John J. Cronin, Director; (Miss Mathilda Mathisen, Medical-Social Faculty)	June 1945		
Louisiana			
Tulane University, School of Social Work (New Orleans): Elizabeth Wisner, Dean	1928		
Massachusetts			
Simmons College, School of Social Work (18 Somerset Street, Boston): Katharine D. Hardwick, Director; (Kate McMahon, director of medical-social work)	1926		
Minnesota			
University of Minnesota, Graduate Course in Social Work (Minneapolis): Gertrude Vaile, Associate Director; (Mrs. Alice Clendening, lecturer in medical-social work, Department of Sociology and Social Work)	1930		
Missouri			
St. Louis University, School of Social Service (St. Louis): Rev. A. H. Scheller, S. J., Director; (Irene Morris, director, Department of Medical-Social Service)	1934		
Washington University, George Warren Brown Department of Social Work (St, Louis): Frank J. Bruno, Head of Department; (Ruth Lewis, associate professor of medical-social work)	1930		
New York			
Columbia University, The New York School of Social Work (122 East 22nd Street, New York, N. Y.): Walter W. Pettit, Director; (Miss Grace White, professor of social work)	1926		
Fordham University, School of Social Service (134 East 39th Street, New York, N. Y.): Anna E. King, Dean; (Catherine Purcell, instructor in medical-social work and assistant director of field work)	1938		
Ohio			
Western Reserve University, School of Applied Social Sciences (Cleveland): Leonard W. Mayo, Dean; (Agnes H. Schroeder, associate professor of medical-social work)	1928		
Pennsylvania			
University of Pennsylvania, Pennsylvania School of Social Work (311 South Juniper St., Philadelphia): Kenneth L. M. Pray, Director; (Mrs. Edith McComb Cresaman, director of medical-social program)	1932	June 1935 July 1945	Approved Oct. 1943
University of Pittsburgh, School of Applied Social Science (Pittsburgh): W. I. Newtetter, Dean; (Eleanor Cockerill, assistant professor of medical-social work)	May 1942		

Schools of social work, director, and director of curriculum in medical-social work	Curriculum in medical-social work		
	Originally approved	Discontinued	Reapproved
Pennsylvania (continued)			
Bryn Mawr College, Graduate Department of Social Economy and Social Research (Bryn Mawr): Mildred Fairchild, Director; (Miss Muriel Gayford, Medical-Social Faculty)	May 30 1944		
Washington			
University of Washington, Graduate of School of Social-Work (Seattle): Grace B. Ferguson, Acting Director	Nov. 1942		
Canada			
The Montreal School of Social Work (3600 University Street, Montreal): Dorothy King, Director; (Miss Roberta Lytle, Medical-Social Faculty)	Aug. 1943		

April 15, 1946.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1946—699633

n 3m
o.38

Dating Decision Number 10

The Dating Periods Recommended for Those Biologic Products Specified In the Biologics Section of The Public Health Service Act of July 1, 1944

Issued May 15, 1947

To Supersede Dating Decision Number 9
Issued January 25, 1943

MISCELLANEOUS PUBLICATION NO. 38

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF PUBLIC HEALTH METHODS

G. ST. J. PERROTT, *Chief of Division*

✦

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1947

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 5 cents

617.07
Zl3 3 no
no. 38

SUBJECT: DATING DECISION NUMBER 10

TO: THE MANUFACTURERS OF THOSE BIOLOGIC PRODUCTS SPECIFIED IN SECTION 351 (A) OF PART F—BIOLOGIC PRODUCTS—OF THE PUBLIC HEALTH SERVICE ACT OF JULY 1, 1944, AND OTHERS CONCERNED

The methods of determining the beginning of the dating period for each product are specified in sections 22.78 and 22.79 of the Regulations, approved January 21, 1947. The purpose of the Dating Decision is to make recommendations as to (1) the interval of time allowable for the dating period of each product and (2) the conditions of storage during the dating period which are deemed necessary in order to warrant the particular dating period. Dating Decision Number 10 supersedes Dating Decision Number 9, issued January 25, 1943.

DEFINITIONS

1.1 (a) "Dating period" means the period beyond which the product cannot be expected beyond reasonable doubt to yield its specific results.

(b) "Expiration date" means the date of termination of the dating period.

(c) "Date of manufacture" means that point in the preparation of a product as is specified in section 22.78 of the Regulations.

Regulation (Sec. 22.78) *Dating period; date of manufacture.*—The dating period shall be determined with reference to the date of manufacture which shall be:

(a) For products for which an official standard of potency exists or which are subject to official potency tests, the last date of satisfactorily passing a potency test;

(b) For products for which no official standard of potency exists or which are not subject to official potency tests,

(1) The date of removal from the animal in case of animal products;

(2) The date of extraction in the case of products used for specific desensitization;

(3) The date of solution in case of venoms, and

(4) The date of cessation of growth in case of other products;

(c) For products which are submitted to the Institute for approval prior to release, the date of official release notice.

(d) "Date of passing potency test" means the date of completion of potency test when performed by the manufacturer

and the date of the official release notice when a product is submitted to the National Institute of Health for approval prior to release.

(e) "Date of issue" means the date on which the finished product is removed from cold storage and made available for, or placed in, distribution by the manufacturer.

(f) "Period of storage" means the interval between the date of manufacture and the date of issue when the product is held as is specified in section 22.79 of the Regulations.

Regulation (Sec. 22.79) *Dating period; products in cold storage.*—The dating period may be determined with reference to the period of issue from cold storage, *Provided*, That, except as may be otherwise prescribed for individual products, the date of such issue is not more than six months after the date of manufacture and the product is kept constantly at a temperature not exceeding 10° C., or not more than 1 year after the date of manufacture if the product is kept constantly at a temperature not exceeding 5° C., or not more than 2 years if the product is kept constantly at a temperature not exceeding 0° C.

(g) "Dried product" means a product which contains not more than 1.00 percent of moisture,—except when otherwise specified for a product, as indicated by the loss of weight when tested by an approved method.

(h) "Recommended storage temperature" means the temperature statement required on the label of a finished product (see section 22.52 (c) of the Regulations). An appropriate statement would be: "Keep at 2° to 10° C. (35.6° to 50° F.),"—except when otherwise specified for a product. (Where space on the label is limited, the temperature may be indicated in only one scale.)

EXPIRATION DATES FOR PRODUCTS
(Not later than as indicated herewith)

1.2 *Antitoxins with official standards, or subject to official potency tests:*

(a) *Liquid antitoxins.*—One year after date of manufacture or 1 year after date of issue, with a 20 percent excess of potency; 2 years with a 30 percent excess; 3 years with a 40 percent excess; or 4 years with a 50 percent excess, except that the expiration date for Meningococcus antitoxin is to be not later than 1 year after date of manufacture or 1 year after date of issue.

(b) *Dried antitoxins.*—Five years after date of manufacture or 5 years after date of issue, with a 10 percent excess of potency, except that the expiration date for Meningococcus antitoxin is to be not later than 5 years after date of

manufacture or 5 years after date of issue with no excess of potency required.

1.3 *Antitoxins without official standards and not subject to official potency tests:*

(a) *Liquid antitoxins.*—One year after date of manufacture or 1 year after date of issue.

(b) *Dried antitoxins.*—Five years after date of manufacture or 5 years after date of issue.

1.4 *Immune therapeutic serums with official standards, or subject to official potency tests:*

(a) *Unmodified liquid immune serums.*—One year after date of manufacture, or 1 year after date of issue if the date of issue is not more than 2 years after the date of manufacture and the product is kept constantly at a temperature not exceeding 5° C.

(b) *Modified liquid immune serums.*—Two years after date of manufacture, or 2 years after date of issue if the date of issue is not more than 2 years after the date of manufacture and the product is kept constantly at a temperature not exceeding 5° C.

(c) *Dried immune serums.*—Five years after date of manufacture or 5 years after date of issue.

1.5 *Immune therapeutic serums without official standards and not subject to official potency tests:*

(a) *Unmodified liquid immune serums.*—One year after date of manufacture, or 1 year after date of issue if the date of issue is not more than 2 years after the date of manufacture and the product is kept constantly at a temperature not exceeding 5° C.

(b) *Modified liquid immune serums.*—Two years after date of manufacture, or 2 years after date of issue if the date of issue is not more than 2 years after the date of manufacture and the product is kept constantly at a temperature not exceeding 5° C.

(c) *Dried immune serums.*—Five years after date of manufacture or 5 years after date of issue.

1.6 *Nonimmune blood derivatives:*

(a) *Liquid normal human serum.*—Eighteen months after date of manufacture or 18 months after date of issue if the date of issue is not more than 2 years after date of manufacture and the product is kept constantly at a temperature not exceeding 5° C.

(b) *Liquid normal human plasma.*—Eighteen months after date of manufacture provided the product is kept at a temperature between 15° and 30° C.; the label should bear the

statement following the expiration date: "if kept between 15° and 30° C. (59° and 86° F.)."

(c) *Frozen normal human serum and plasma.*—Three years after date of manufacture provided the product is kept constantly at a temperature not exceeding *minus* 18° C.; the label should bear the statement following the expiration date "if kept below *minus* 18° C. (*minus* 0.4° F.)." Frozen serum may be melted and given an expiration date not more than 1 year after the date of melting. Frozen plasma may be melted and given an expiration date not more than 1 year after the date of melting provided the melted product is kept constantly at a temperature between 15° and 30° C.; the label should bear the statement following the expiration date "if kept between 15° and 30° C. (59° and 86° F.)."

(d) *Other liquid normal serums.*—Three years after date of manufacture or 3 years after date of issue.

(e) *Dried normal serum and plasma.*—Five years after date of manufacture or 5 years after date of issue.

(f) *Liquid normal serum albumin.*—Five years after date of manufacture or 5 years after date of issue provided the product is prepared as a 25 percent solution in a suitably buffered diluent.

(g) *Dried antihemophilic globulin.*—One year after date of manufacture or 1 year after date of issue.

(h) *Dried thrombin.*—Three years after date of manufacture or 3 years after date of issue.

(i) *Dried fibrinogen.*—Three years after date of manufacture or 3 years after date of issue.

(j) *Hemostatic globulin.*—One year after date of manufacture or 1 year after date of issue.

(k) *Fibrin foam.*—Three years after date of manufacture or 3 years after date of issue.

(l) *Fibrin film.*—Three years after date of manufacture or 3 years after date of issue.

(m) *Citrated whole blood.*—Twenty-one days after date of manufacture, but only if stored continuously at 4° to 10° C., preferably 4° to 6° C.

(n) *Packed or resuspended red blood cells.*—Ten days after date of manufacture, but only if stored continuously at 4° to 10° C., preferably 4° to 6° C.

(o) *Human red blood cells.*—Either dried or as a paste, 1 year after date of manufacture or 1 year after date of issue.

(p) *Blood grouping serum.*—One year if liquid, and 5 years if dried, after date of manufacture or the corresponding intervals after date of issue.

(q) *Anti-Rh typing serum.*—The same as 1.6 (p).

1.7 *Vaccines made from Viruses and Rickettsiae:*

(a) *Smallpox vaccine.*—Three months after date of manufacture or 3 months after date of issue for glycerinated vaccine; but only if the label bears the following statement: "expiration date: _____, if kept below 5° C. (41° F.); preferably below 0° C. (32° F.)." The date of issue to be not more than 9 months after date of manufacture. The date of manufacture may be the date of last passing potency test, provided the freshly harvested unglycerinated pulp has been stored at *minus* 20° C. or lower and the glycerinated vaccine, either in bulk or finished capillaries, has been stored below *minus* 10° C.

(b) *Dried smallpox vaccine.*—Six months after date of manufacture or six months after date of issue.

(c) *Rabies vaccine.*—Six months after date of manufacture or 6 months after date of issue. The date of issue to be not more than three months after the date of suspending the brain tissue provided the product is kept above freezing, but not over 5° C. The date of manufacture is the date of preparing the brain suspension provided the whole brain has been continuously stored without preservative at *minus* 15° C. or lower.

(d) *Yellow fever vaccine.*—One year after date of manufacture or 1 year after date of issue provided the product is kept constantly below 5° C. (41° F.); the label should bear the statement following the expiration date: "If kept below 5° C. (41° F.); preferably below 0° C. (32° F.)." The date of issue to be not more than 1 year after date of manufacture provided the product is kept constantly below *minus* 5° C. (23° F.), preferably below *minus* 20° C. The date of manufacture may be the date of last passing potency test, provided the harvested material has been stored continuously at *minus* 20° C. or lower.

(e) *Influenza virus vaccine.*—Eighteen months after date of manufacture or 18 months after date of issue.

(f) *Typhus vaccines.*—Eighteen months after date of manufacture or 18 months after date of issue.

(g) *Rocky Mountain spotted fever vaccine.*—Eighteen months after date of manufacture or 18 months after date of issue.

(h) *Equine encephalomyelitis vaccine.*—Twelve months after date of manufacture or 12 months after date of issue.

(i) *Encephalitis, herpes "F" strain vaccine.*—Twelve months after date of manufacture or 12 months after date of issue.

1.8 *Vaccines and antigens made from bacteria:*

(a) *Bacterial vaccines.*—Eighteen months if liquid, and 5 years if dried, after date of manufacture or the corresponding intervals after date of issue.

(b) *Sensitized bacterial vaccines.*—The same as 1.8 (a).

(c) *Modified bacterial derivaties.*—The same as 1.8 (a).

(d) *Bacterial antigens.*—The same as 1.8 (a).

1.9 *Toxins, toxoids and tuberculins:*

(a) *Diphtheria toxin for the Schick test.*—Six months after date of manufacture or 6 months after date of issue for undiluted toxin. One year after date of manufacture or 1 year after date of issue for diluted toxin.

(b) *Diphtheria toxoid.*—Two years after date of manufacture or 2 years after date of issue.

(c) *Scarlet fever streptococcus toxin for the Dick test.*—One year after date of manufacture or 1 year after date of issue for diluted toxin. Five years after date of manufacture for undiluted toxin if kept constantly at a temperature not exceeding 5° C.

(d) *Scarlet fever streptococcus toxin for immunization.*—The same as 1.9 (c).

(e) *Streptococcus erythrogenic toxin.*—The same as 1.9 (c).

(f) *Staphylococcus toxoid.*—The same as 1.9 (b).

(g) *Tetanus toxoid.*—The same as 1.9 (b).

(h) *Liquid tuberculins.*—Five years after date of manufacture or 5 years after date of issue in case of concentrated tuberculins containing at least 50 percent glycerin. One year after date of manufacture or 1 year after date of issue in case of other liquid tuberculins.

(i) *Dried tuberculins.*—Five years after date of manufacture or 5 years after date of issue.

1.10 *Allergenic extracts:*

(a) *Pollen, animal derivative, food, vegetable derivative, and miscellaneous extracts.*—Animal oil extracts and vegetable oil extracts, 5 years after date of manufacture or 5 years after date of issue. All others, 18 months after date of manufacture, or 18 months after date of issue, except that the date of issue for extracts containing at least 50 percent glycerin may extend to a maximum of 4 years after date of manufacture, or 4 years after date of issue if the product is kept constantly at a temperature not exceeding 10° C.

(b) *Fungus extracts and fungus antigens.*—Three years after date of manufacture or 3 years after date of issue if the date of issue is not more than 2 years after date of manufacture and the product is kept constantly at a temperature not exceeding 5° C.

1.11 *Trivalent organic arsenicals:*

(a) *Acetylglycarsenobenzene.*—Eighteen months after date of manufacture.

(b) *Arsphenamine.*—Five years after date of manufacture.

(c) *Arsphenamine diglucoside.*—The same as 1.11 (b).

(d) *Bismuth arsphenamine sulfonate.*—The same as 1.11 (b).

(e) *Dichlorophenarsine hydrochloride.*—Three years after date of manufacture.

(f) *Neoarsphenamine.*—Four years after date of manufacture.

(g) *Oxophenarsine hydrochloride.*—Two and one-half years after date of manufacture.

(h) *Oxophenarsine triazine.*—Two and one-half years after date of manufacture.

(i) *Silver arsphenamine.*—The same as 1.11 (b).

(j) *Sulfarsphenamine.*—The same as 1.11 (b).

1.12 Miscellaneous products:

(a) *Poison ivy, poison oak, and poison sumac.*—Five years after date of manufacture or 5 years after date of issue.

(b) *Venoms.*—Eighteen months if liquid, and 5 years if dried, after date of manufacture, or the corresponding intervals after date of issue.

(c) *Trichinella extract.*—The same as 1.12 (b).

(d) *Leucocyte extract.*—One year after date of manufacture or 1 year after date of issue.

(e) *Blood group specific substance A and B.*—One year after date of manufacture or 1 year after date of issue.

(f) *Histamine azoprotein.*—One year after date of manufacture or 1 year after date of issue.

THOMAS PARRAN
Surgeon General

○

614.09
Un3m
no.39

Biological Products

Establishments Licensed for the Preparation and Sale of Viruses, Serums, Toxins and Analogous Products and the Trivalent Organic Arsenic Compounds

THE LIBRARY OF THE
OCT 15 1949
UNIVERSITY OF ILLINOIS

Issued January 3, 1949

To Supersede Reprint No. 2661 from
Pub. Health Rep. 60: 1172–1178, 1945

MISCELLANEOUS PUBLICATION NO. 39

FEDERAL SECURITY AGENCY

PUBLIC HEALTH SERVICE

FEDERAL SECURITY AGENCY

Oscar R. Ewing, Administrator

PUBLIC HEALTH SERVICE

Leonard A. Scheele, Surgeon General

Division of Public Health Methods

G. St. J. Perrott, Chief of Division

✦

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1949

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 10 cents

614.09
U73 3rn
No. 39

BIOLOGICAL PRODUCTS[1]

Establishments Licensed for the Preparation and Sale of Viruses, Serums, Toxins, and Analogous Products

There is presented herewith a list of the establishments holding licenses issued by the Federal Security Agency in accordance with section 351 of an Act of Congress approved July 1, 1944, entitled "Public Health Service Act" (58 Stat. 682). Section 351 of this act is designed to regulate the sale of viruses, serums, toxins, or analogous products, or arsphenamine or its derivatives (or any other trivalent organic arsenic compound) in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes.

The licenses granted to these establishments for the products mentioned do not imply an endorsement for the respective preparations. The granting of a license means that the establishment is inspected regularly as to the technical ability of the responsible personnel and as to the sanitary condition of the premises; it means that all products are manufactured by methods considered to be safe; it means that tests have been applied to the finished products to insure their safety and purity; it means that in all instances where there is an official standard of potency, or where an official test of potency is recognized, the products have been tested against such standards or by such a test; it means that the establishment also is required to carry out any other requirements specified by the National Institutes of Health, designed to insure the continued safety, purity, and potency of the licensed products.

License No. 1—Parke, Davis & Co., Detroit, Mich.

1. ANTITOXINS

Diphtheria
Dysentery (Shiga)
Gas gangrene (polyvalent)
Cl. novyi (B. oedmatiens)
Cl. perfringens
Cl. septicum (V. septique)
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. BLOOD FRACTIONS

Fibrinogen (bovine)
Histamine azoprotein
Grouping serum, Anti-A
Grouping serum, Anti-B
Serum, hemostatic
Thrombin (bovine)
Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rh_o' (Anti-CD)

[1] From the Laboratory of Biologics Control, National Institutes of Health.

822937—49——1

3. VIRAL AND RICKETTSIAL VACCINES

Influenza virus
Rabies
Smallpox

4. BACTERIAL VACCINES[1]

Cholera
Pertussis (fluid)
Pertussis (a. p.)
Typhoid
Typhoid-paratyphoid

5. BACTERIAL ANTIGENS

Six polyvalent bacterial antigens with "No. U. S. Standard of Potency."

6. MODIFIED BACTERIAL DERIVATIVES

Two polyvalent modified bacterial antigens with "No U. S. Standard of Potency."

7. TUBERCULIN PREPARATIONS

Tuberculin, autolytic
Tuberculin, old
Tuberculin, purified protein derivative

8. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Scarlet fever streptococcus toxin for Dick test
Diphtheria toxoid (alum. phosphate precip.)
Schick test control
Staphylococcus toxoid
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

9. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (fluid)-Pertussis vaccine Combined
Diphtheria toxoid (a. p.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids Combined (fluid)
Diphtheria-Tetanus toxoids Combined (a. p.)
Diphtheria-Tetanus toxoids-Pertussis vaccine Combined (a. p.)
Staphylococcus toxoid-B. antigen made from Staphylococcus (albus and aureus)

10. ALLERGENIC EXTRACTS

Animal
Food
House dust
Poison ivy
Pollen

11. TRIVALENT ORGANIC ARSENICALS

Dichlorophenarsine hydrochloride
Oxophenarsine hydrochloride

[1] In addition 9 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."

License No. 2—Sharp and Dohme, Philadelphia, Pa.

1. THERAPEUTIC IMMUNE SERUMS

Antibrucella
Anti-Rocky Mountain spotted fever
Antitularemic
Antivenin (L. mactans)

2. BLOOD FRACTIONS

Cells, human blood (dried)
Globulin, immune serum (human)
Grouping serum, Anti-A
Grouping serum, Anti-B
Group-specific substances A and B
Plasma, normal human
Thrombin (human)

3. VIRAL AND RICKETTSIAL VACCINES

Influenza virus
Rabies
Rocky Mountain spotted fever
Smallpox
Typhus

4. BACTERIAL VACCINES[1]

Cholera
Pertussis
Typhoid
Typhoid-Paratyphoid

5. SENSITIZED BACTERIAL VACCINES[2]

Pertussis
Typhoid
Typhoid-Paratyphoid

6. BACTERIAL ANTIGENS

Three polyvalent bacterial antigens with "No U. S. Standard of Potency."

7. TUBERCULIN PREPARATIONS

Tuberculin, purified protein derivative

8. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Diphtheria toxoid (protamine precipitated)
Scarlet fever streptococcus toxin for Dick test
Scarlet fever streptococcus toxin for immunization
Schick test control
Staphylococcus toxoid
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

9. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid-Pertussis vaccine Combined (a. p.)
Diphtheria-Tetanus toxoids Combined (a. p.)
Diphtheria-Tetanus toxoids (fluid)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids (a. p.) Pertussis vaccine Combined

[1] In addition 3 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency".
[2] In addition 6 sensitized bacterial vaccines (polyvalent) with "No U. S. Standard of Potency".

10. VENOMS

Bee venom solution

11. ALLERGENIC EXTRACTS

Poison ivy
Poison oak

License No. 8—Cutter Laboratories, Berkeley, Calif.

1. ANTITOXINS

Diphtheria
Gas gangrene (polyvalent)
Cl. novyi (B. oedematiens)
Cl. perfringens
Cl. septicum (V. septique)
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. THERAPEUTIC IMMUNE SERUMS

Antipertussis (human)

3. BLOOD FRACTIONS

Albumin, normal serum (human)
Fibrinogen (human)
Fibrin film (human)
Fibrin foam (human)
Globulin, immune serum (human)
Globulin, antihemophilic (human)
Grouping serum, Anti-A
Grouping serum, Anti-B
Plasma, normal human
Thrombin (human)

4. VIRAL AND RICKETTSIAL VACCINES

Equine encephalomyelitis (Eastern)
Equine encephalomyelitis (Western)
Rabies
Smallpox

5. BACTERIAL VACCINES [1]

Cholera
Pertussis (fluid)
Pertussis (al. hydrox. ads.)
Plague
Typhoid
Typhoid-Paratyphoid

6. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (al.hydrox.ads.)
Schick test control
Tetanus toxoid (fluid)
Tetanus toxoid (al. hydrox. ads.)

7. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid-Pertussis vaccine Combined (fluid)
Diphtheria toxoid (al. hydrox. ads.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids (al. hydrox. ads.)
Tetanus toxoid-Pertussis vaccine Combined (fluid)
Diptheria-Tetanus toxoids-Pertussis vaccine Combined (fluid)
Diphtheria-Tetanus toxoids (al. hydrox. ads.)-Pertussis vaccine Combined

[1] In addition 3 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency".

8. TUBERCULIN PREPARATIONS

Tuberculin, old

9. ALLERGENIC EXTRACTS

Coccidioidin
House dust
Poison ivy
Poison oak
Pollen

License No. 11—Institut Pasteur, Paris, France

1. ANTITOXINS

Diphtheria
Tetanus

2. BACTERIAL VACCINES

Cholera
Typhoid

3. TOXINS AND TOXOIDS

Staphylococcus toxoid

License No. 14—Bureau of Laboratories, Department of Health, New York City

1. ANTITOXINS

Diphtheria
Tetanus

2. BLOOD FRACTIONS

Serum, normal horse

3. VIRAL AND RICKETTSIAL VACCINES

Rabies
Smallpox

4. BACTERIAL VACCINES

Pertussis
Typhoid
Typhoid-Paratyphoid

5. TUBERCULIN PREPARATIONS

Tuberculin, old

6. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Schick test control
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

License No. 17—Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

1. ANTITOXINS

Botulism (bivalent)
Diphtheria
Gas gangrene (polyvalent)
Cl. histolyticum
Cl. novyi (B. oedematiens)
Cl. perfringens
Cl. septicum (V. septique)
Cl. sordelli (B. sordellii)
Scarlet fever streptococcus
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. THERAPEUTIC IMMUNE SERUMS

Anti-Hemophilus influenzae Type b (rabbit)
Anti-Rocky Mountain spotted fever

3. BLOOD FRACTIONS

Anti-M serum
Anti-N serum
Globulin, immune serum
Grouping serum, Anti-A
Grouping serum, Anti-B
H. influenzae typing serum
Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rh_o' (Anti-CD)

4. VIRAL AND RICKETTSIAL VACCINES

Encephalitis (herpes "F" strain)
Influenza virus
Rabies
Rocky Mountain spotted fever
Smallpox
Typhus (epidemic type)
Typhus (murine type)

5.. BACTERIAL VACCINES[1]

Cholera
Pertussis
Typhoid
Typhoid-Paratyphoid

6. BACTERIAL ANTIGENS

One bacterial antigen with "No U. S. Standard of Potency."

7. TUBERCULIN PREPARATIONS

Tuberculin, old
Tuberculin, patch test

8. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Scarlet fever streptococcus toxin for Dick test
Scarlet fever streptococcus toxin for immunization
Schick test control
Staphylococcus toxoid
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

9. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria-Tetanus toxoids (a. p.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids (a. p.) Combined

10. VENOMS

Moccasin venom solution

11. ALLERGENIC EXTRACTS

Animal
Food
Fungus
House dust
Poison ivy
Poison oak
Pollen
Trichinella

[1] In addition 4 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."

License No. 30—Sherman Laboratories (G. H. Sherman, M. D., Founder), Detroit, Mich.

1. BACTERIAL VACCINES[1]

Pertussis
Typhoid-Paratyphoid
Typhoid

2. BACTERIAL ANTIGENS

One bacterial antigen (polyvalent) with "No U. S. Standard of Potency."

3. TOXINS AND TOXOIDS

Diphtheria toxoid (a. p.)
Staphylococcus toxoid

4. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (a. p.)-Pertussis vaccine Combined
Staphylococcus toxoid-B. vaccine made from Staphylococcus aureus

5. ALLERGENIC EXTRACTS

Poison ivy
Poison ivy-Poison oak Combined
Poison oak
Pollen

License No. 43—The Abbott Laboratories, North Chicago, Ill.

1. BACTERIAL VACCINES

Three bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."

2. BACTERIAL ANTIGENS

One bacterial antigen with "No U. S. Standard of Potency."

3. ALLERGENIC EXTRACTS

Fungus
Pollen
Poison ivy

4. TRIVALENT ORGANIC ARSENICALS

Arsphenamine
Neoarsphenamine
Arsphenamine, bismuth sulfonate
Sulfarsphenamine
Dichlorophenarsine hydrochloride

License No. 51—Upjohn Co., Kalamazoo, Mich.

1. BLOOD FRACTIONS

Albumin, normal serum
Thrombin (bovine)
Globulin, immune serum (human)

2. BACTERIAL VACCINES[2]

Pertussis

---

[1] In addition 18 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."
[2] In addition 1 bacterial vaccine (polyvalent) with "No U. S. Standard of Potency."

3. TOXINS AND TOXOIDS

Diphtheria toxoid (a. p.)

4. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (a. p.)-Pertussis vaccine Combined

License No. 52—E. R. Squibb & Sons, New Brunswick, N. J.

1. ANTITOXINS

Diphtheria
Gas gangrene (polyvalent)
Cl. novyi (B. oedematiens)
Cl. perfringens
Cl. septicum (V. septique)
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. THERAPEUTIC IMMUNE SERUMS

Anti-Hemophilus influenzae Type b
Antipertussis (rabbit)

3. BLOOD FRACTIONS

Albumin, normal serum (human)
Fibrin film (human)
Fibrin foam (human)
Globulin, immune serum (human)
Serum, normal horse
Thrombin (human)

4. VIRAL AND RICKETTSIAL VACCINES

Influenza virus
Lymphogranuloma venereum antigen
Rabies
Rocky Mountain spotted fever
Smallpox

5. BACTERIAL VACCINES [1]

Pertussis
Typhoid
Typhoid-Paratyphoid

6. BACTERIAL ANTIGENS

Pneumococcus polysaccharides

7. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Scarlet fever streptococcus toxin for Dick test
Scarlet fever streptococcus toxin for immunization
Schick test control
Staphylococcus toxoid
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

8. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (a. p.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids (a. p.)-Pertussis vaccine Com-

[1] In addition 1 bacterial vaccine (polyvalent) with "No U. S. Standard of Potency."

Diphtheria-Tetanus toxoids Combined (a. p.)
Staphylococcus toxoid-B. antigen made from Staphylococcus (aureus and albus) Combined

9. TRIVALENT ORGANIC ARSENICALS

Dichlorophenarsine hydrochloride
Neoarsphenamine

License No. 56—Eli Lilly & Co., Indianapolis, Ind.

1. ANTITOXINS

Diphtheria
Cl. perfringens
Cl. septicum (V. septique)
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. VIRAL AND RICKETTSIAL VACCINES

Influenza virus
Rabies
Smallpox
Typhus

3. BACTERIAL VACCINES[1]

Cholera
Pertussis (fluid)
Pertussis (a. p.)
Typhoid
Typhoid-Paratyphoid

4. BACTERIAL ANTIGENS

Thirteen bacterial antigens (polyvalent) with "No U. S. Standard of Potency".

5. TUBERCULIN PREPARATIONS

Tuberculin, old

6. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Schick test control
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

7. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (fluid)-Pertussis vaccine Combined
Diphtheria toxoid (a. p.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids Combined (fluid)
Diphtheria-Tetanus toxoids Combined (a. p.)
Diphtheria-Tetanus toxoids(fluid)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids-Pertussis vaccine Combined (a. p.)

8. ALLERGENIC EXTRACTS

Fungus
Insect
Pollen

[1] In addition 11 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency".

License No. 64—Antitoxin and Vaccine Laboratory, Department of Public Health, Commonwealth of Massachusetts, Boston, Mass.

1. ANTITOXINS

Diphtheria
Scarlet fever streptococcus

2. THERAPEUTIC IMMUNE SERUMS

Anti-Hemophilus influenzae Type b

3. BLOOD FRACTIONS

Albumin, normal serum (human)
Globulin, immune serum (human)

4. VIRAL AND RICKETTSIAL VACCINES

Smallpox

5. BACTERIAL VACCINES

Pertussis (fluid)
Typhoid
Typhoid-Paratyphoid

6. TUBERCULIN PREPARATIONS

Tuberculin, old

7. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Schick test control
Diptheria toxoid (fluid)
Tetanus toxoid (fluid)

License No. 65—U. S. Standard Products Co., Woodworth, Wis.

1. ANTITOXINS

Diphtheria

2. VIRAL AND RICKETTSIAL VACCINES

Rabies
Smallpox

3. BACTERIAL VACCINES[1]

Pertussis
Typhoid-Paratyphoid
Typhoid

4. BACTERIAL ANTIGENS

One bacterial antigen (polyvalent) with "No U. S. Standard of Potency"

5. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Scarlet fever streptococcus toxin for Dick test
Scarlet fever streptococcus toxin for immunization
Schick test control
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

6. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria-Tetanus toxoids Combined (a. p.)

[1] In addition 8 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency".

7. ALLERGENIC EXTRACTS

Poison ivy
Poison oak
Pollen

License No. 66—D. L. Harris Laboratories, St. Louis, Mo.

1. VIRAL AND RICKETTSIAL VACCINES

Rabies

License No. 67—Arlington Chemical Co., Yonkers, N. Y.

1. ALLERGENIC EXTRACTS

Animal
Food
Fungus
Poison ivy
Pollen

License No. 69—Winthrop-Stearns, Inc., Rensselaer, N. Y.

1. TRIVALENT ORGANIC ARSENICALS

Acetylglycarsenobenzene
Dichlorophenarsine hydrochloride
Neoarsphenamine

License No. 73—Connaught Antitoxin Laboratory, University of Toronto, Toronto, Canada

1. ANTITOXINS

Diphtheria
Staphylococcus
Tetanus

2. TOXINS AND TOXOIDS

Diphtheria toxoid (fluid)
Staphylococcus toxoid
Tetanus toxoid (fluid)

License No. 82—Merck & Co., Inc., Rahway, N. J.

1. TRIVALENT ORGANIC ARSENICALS

Arsphenamine
Neoarsphenamine
Sulfarsphenamine

License No. 84—Terrell Laboratories, Fort Worth, Tex.

1. VIRAL AND RICKETTSIAL VACCINES

Rabies

2. ALLERGENIC EXTRACTS

House dust
Pollen

License No. 85—Jensen-Salsbery Laboratories, Kansas City, Mo.

1. BACTERIAL VACCINES

One bacterial vaccine (polyvalent) with "No U. S. Standard of Potency."

License No. 91—Hollister-Stier Laboratories, Spokane, Wash., Los Angeles, Calif., and Wilkinsburg, Pa.

1. BACTERIAL VACCINES

Two bacterial vaccine (polyvalent) with "No U. S. Standard of Potency".

2. ALLERGENIC EXTRACTS

Animal
Food
Fungus
House dust
Poison ivy
Poison oak
Pollen

License No. 99—Bureau of Laboratories, Michigan State Department of Health, Lansing, Mich.

1. ANTITOXINS

Diphtheria
Scarlet fever streptococcus
Tetanus

2. THERAPEUTIC IMMUNE SERUMS

Anti-H. influenzae Type b
Antimeningococcic
Antipneumococcic

3. BLOOD FRACTIONS

Albumin, normal serum (human)
Globulin, immune serum (human)
Plasma, normal human
Serum, pneumococcus typing

4. VIRAL AND RICKETTSIAL VACCINES

Rabies
Smallpox

5. BACTERIAL VACCINES

Pertussis
Typhoid
Typhoid-Paratyphoid

6. TUBERCULIN PREPARATIONS

Tuberculin, old

7. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Scarlet fever streptococcus toxin for Dick test
Scarlet fever streptococcus toxin for immunization
Schick test control
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

8. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid-Pertussis vaccine Combined (fluid)
Diphtheria-Tetanus toxoids-Pertussis vaccine Combined (fluid)
Diphtheria-Tetanus toxoids-Pertussis vaccine Combined (a. p.)

License No. 101—National Drug Co., Philadelphia, Pa.

1. ANTITOXINS

Diphtheria
Gas gangrene (polyvalent)
Cl. novyi (B. oedmatiens)
Cl. perfringens
Cl. septicum (V. septique)
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. VIRAL AND RICKETTSIAL VACCINES

Influenza virus
Rabies
Smallpox

3. BACTERIAL VACCINES[1]

Cholera
Pertussis (fluid)
Pertussis (a. p.)
Typhoid
Typhoid-Paratyphoid

4. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Scarlet fever streptococcus toxin for Dick test
Scarlet fever streptococcus toxin for immunization
Schick test control
Staphylococcus toxoid
Streptococcus erythrogenic toxin
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

5. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (a. p.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids Combined (a. p.)
Diphtheria-Tetanus toxoids (fluid)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids (a. p.)-Pertussis vaccine Combined
Staphylococcus toxoid-B. vaccine made from Staphylococcus (aureus)
Staphylococcus toxoid-Streptococcus toxin-B. vaccine made from Staphylococcus (aureus), Streptococcus (hemolyticus), D. pneumonia, and H. influenzae

6. ALLERGENIC EXTRACTS

House dust
Pollen

License No. 102—Mulford Colloid Laboratories, Philadelphia, Pa.

1. ALLERGENIC EXTRACTS

Poison ivy
Poison ivy, tincture
Poison oak

[1] In addition 4 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."

License No. 103—Allergy Laboratories, Oklahoma City, Okla.

1. ALLERGENIC EXTRACTS

Animal
Food
Fungus
House dust
Pollen

License No. 105—C. F. Kirk Co., New York, N. Y.

1. BACTERIAL VACCINES[1]

Pertussis
Typhoid
Typhoid-Paratyphoid

2. ALLERGENIC EXTRACTS

Pollen

License No. 107—Porro Biological Laboratories, Tacoma, Wash.

1. BACTERIAL VACCINES

One bacterial vaccine (polyvalent) with "No U. S. Standard of Potency."

2. ALLERGENIC EXTRACTS

Animal
Food
House dust
Pollen

License No. 109—Central Pharmacal Co., Seymour, Ind.

1. BACTERIAL ANTIGENS

Four bacterial antigens (polyvalent) with "No U. S. Standard of Potency."

2. ALLERGENIC EXTRACTS

Poison ivy-Poison oak Combined

License No. 110—Pitman-Moore Co., Division of Allied Laboratories, Inc., Zionsville, Ind.

1. ANTITOXINS

Diphtheria
Cl. perfringens
Cl. septicum (V. Septique)
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. THERAPEUTIC IMMUNE SERUMS

Antierysipeloid

3. BLOOD FRACTIONS

Globulin, immune serum (human)

[1] In addition 14 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."

4. VIRAL AND RICKETTSIAL VACCINES

Equine encephalomyelitis (Eastern)
Equine encephalomyelitis (Western)
Influenza virus
Rabies
Typhus (epidemic)

5. BACTERIAL VACCINES[1]

Pertussis
Typhoid
Typhoid-Paratyphoid

6. TUBERCULIN PREPARATIONS

Tuberculin, old

7. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (a. p.)
Staphylococcus toxoid
Schick test control
Tetanus toxoid (a. p.)

8. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (a. p.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids Combined (a. p.)
Diphtheria-Tetanus toxoids (a. p.)-Pertussis vaccine Combined

9. ALLERGENIC EXTRACTS

Poison ivy
Poison oak
Poison ivy-Poison oak
Pollen

License No. 111—Wm. S. Merrell Co., Cincinnati, Ohio

1. BACTERIAL VACCINES

One bacterial vaccine (polyvalent) with "No U. S. Standard of Potency."

License No. 113—Michael Reese Research Foundation, Chicago, Ill.

1. THERAPEUTIC IMMUNE SERUMS

Measles (human)
Mumps (human)
Poliomyelitis (human)
Scarlet fever (human)

2. BLOOD FRACTIONS

Blood, citrated whole (human)
Cells, packed red blood
Cells, resuspended red blood
Grouping serum, Anti-A
Grouping serum, Anti-B
Plasma, normal human
Serum, normal human
Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rh_o' (Anti-CD)
Anti-rh′ (Anti-C)
Anti-rh″ (Anti-E)

[1] In addition 13 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."

License No. 116—Laboratorio Brasileiro de Chimiotherapia, Rio de Janeiro, Brazi

1. ALLERGENIC EXTRACTS

Fungus (polyvalent)

License No. 117—Milwaukee Serum Center, Milwaukee, Wis..

1. THERAPEUTIC IMMUNE SERUMS

Measles (human)
Mumps (human)
Pertussis (human)
Poliomyelitis (human)
Scarlet fever (human)

2. BLOOD FRACTIONS

Serum, normal human

License No. 119—Barry Allergy Laboratory, Detroit, Mich.

1. ALLERGENIC EXTRACTS

Poison ivy
Poison oak
Poison ivy-oak-sumac Combined
Pollen
Sumac

License No. 120—Biological Laboratory, Illinois Department of Health, Chicago Ill.

1. VIRAL AND RICKETTSIAL VACCINES

Rabies

2. BACTERIAL VACCINES

Typhoid
Typhoid-Paratyphoid

3. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Schick test control

License No. 121—State Department of Health, Austin, Tex.

1. VIRAL AND RICKETTSIAL VACCINES

Rabies

2. BACTERIAL VACCINES

Pertussis
Typhoid-Paratyphoid

3. TUBERCULIN PREPARATIONS

Tuberculin, old

4. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Schick test control

5. MULTIPLE ANTIGEN PREPARATIONS

Pertussis vaccine-Diphtheria toxoid Combined (a. p.)

License No. 125—Hynson, Westcott & Dunning, Baltimore, Md.

1. VENOMS

Cobra venom solution

License No. 129—Wellcome Physiological Research Laboratories, Beckenham, Kent, England

1. VENOMS

Russell viper venom solution

License No. 135—Bio-Therapeutic Laboratories, East Orange, N. J.

1. BACTERIAL ANTIGENS

One bacterial antigen (polyvalent) with "No U. S. Standard of Potency."

License No. 137—Iowa State Department of Health Serum Center, Des Moines, Iowa

1. THERAPEUTIC IMMUNE SERUMS

Measles (human
Pertussis (human)
Poliomyelitis (human)
Scarlet fever (human)

2. BLOOD FRACTIONS

Serum, normal human

License No. 138—University of Minnesota Human Serum Laboratory, Minneapolis, Minn.

1. THERAPEUTIC IMMUNE SERUMS

Measles (human)
Mumps (human)
Pertussis (human)
Poliomyelitis (human)
Scarlet fever (human)

2. BLOOD FRACTIONS

Serum, normal human

License No. 139—Philadelphia Serum Exchange, Philadelphia, Pa.

1. THERAPEUTIC IMMUNE SERUMS

Measles (human)
Mumps (human)
Pertussis (human)
Scarlet fever (human)

2. BLOOD FRACTIONS.

Blood, citrated whole (human)
Grouping serum, Anti-A
Grouping serum, Anti-B
Serum, normal human

Anti-Rh typing serums:
Anti-Rh_0 (Anti-D)
Anti-Rh_0' (Anti-CD)
Anti-rh′ (Anti-C)
Anti-rh″ (Anti-E)

License No. 140—Hyland Laboratories, Los Angeles, Calif.

1. THERAPEUTIC IMMUNE SERUMS

Measles (human)
Mumps (human)
Pertussis (human)
Poliomyelitis (human)
Scarlet fever (human)

2. BLOOD FRACTIONS

Blood, citrated whole (human)
Cells, human blood (dried)
Cells, Packed red blood (human)
Cells, Resuspended red blood (human)
Group AB serum (human)
Grouping serum, Anti-A
Grouping serum, Anti-B
Plasma, normal human
Anti-Rh typing serum:
Anti-Rh_o (Anti-D)
Anti-Rh_orh′rh″ (Anti-CDE)

License No. 141—Venomin Co., Lorain, Ohio

1. VENOMS

Cobra venom solution
Moccasin venom ointment
Moccasin venom solution

License No. 144—Wyeth, Inc., Marietta, Pa.

1. ANTITOXINS

Diphtheria
Dysentery (Shiga)
Gss gangrene (polyvalent)
Cl. novyi (B. oedmatiens)
Cl. perfringens
Cl. septicum (V. septique)
Tetanus
Tetanus-Gas gangrene (polyvalent)

2. THERAPEUTIC IMMUNE SERUMS

Antidysenteric
Antipertussis (rabbit)
Antimeningococcic
Antipneumococcic
Anti-Rocky Mountain spotted fever
Antivenin (Nearctic crotalidae)

3. BLOOD FRACTIONS

Globulin, immune serum (human)
Plasma, normal human
Serum, normal horse
Serum, pneumococcus typing

4. VIRAL AND RICKETTSIAL VACCINES

Rabies
Rocky Mountain spotted fever
Smallpox
Typhus

5. BACTERIAL VACCINES [1]

Cholera
Pertussis
Typhoid
Typhoid-Paratyphoid

[1] In addition 8 bacterial vaccines (polyvalent) with "No U. S. Standard of Potency."

3. TOXINS AND TOXOIDS

Diphtheria toxin for Schick test
Diphtheria toxoid (fluid)
Diphtheria toxoid (a. p.)
Scarlet fever streptococcus toxin for Dick test
Scarlet fever streptococcus toxin for immunization
Schick test control
Staphylococcus toxoid
Tetanus toxoid (fluid)
Tetanus toxoid (a. p.)

7. MULTIPLE ANTIGEN PREPARATIONS

Diphtheria toxoid (a. p.)-Pertussis vaccine Combined
Diphtheria-Tetanus toxoids Combined (a. p.)
Diphtheria-Tetanus toxoids (a. p.)-Pertussis vaccine Combined

8. ALLERGENIC EXTRACTS

Animal
Bacterial
Food
House dust
Poison ivy
Poison oak
Pollen

License No. 147—Endo Products, Inc., Richmond Hill, N. Y.

1. ALLERGENIC EXTRACTS

House dust

License No. 149—The Armour Laboratories, Division of Armour and Co., Fort Worth, Tex.

1. BLOOD FRACTIONS

Albumin, normal serum
Fibrin film
Fibrin foam
Globulin, immune serum (human)
Thrombin (human)

License No. 151—Allergy Research Laboratories, Phoenix, Ariz.

1. ALLERGENIC EXTRACTS

Pollen

License No. 152—Gotham Pharmaceutical Co., Brooklyn, N. Y.

1. ALLERGENIC EXTRACTS

House dust
Pollen

License No. 153—Atlantic Biochemical Co., Concord, N. H.

1. VENOMS

Bee venom solution

License No. 154—Blood Bank of Dade County, Inc., Miami, Fla.

1. BLOOD FRACTIONS

Blood, citrated whole (human)
Cells, packed red blood (human)
Cells, resuspended red blood (human)
Grouping serum, Anti-A
Grouping serum, Anti-B
Group O serum
Plasma, normal human

Anti-Rh typing serums:
Anti-Rh_0 (Anti-D)
Anti-Rh_0' (Anti-CD)
Anti-Rh_0'' (Anti-DE)
Anti-rh'' (Anti-E)
Anti-hr' (Anti-c)
Anti-hr'' (Anti-e)
Anti-$Rh_0rh'rh''$ (Anti-CDE)

License No. 155—Wiener Serum Laboratory, Brooklyn, N. Y.

1. BLOOD FRACTIONS

Absorbed Anti-A serum
Anti-M serum
Anti-N serum
Grouping serum, Anti-A
Grouping serum, Anti-B

Anti-Rh typing serums:
Anti-Rh_0 (Anti-D)
Anti-Rh_0' (Anti-CD)
Anti-Rh_0'' (Anti-DE)
Anti-rh' (Anti-C)
Anti-rh'' (Anti-E)
Anti-hr' (Anti-c)
Anti-hr'' (Anti-e)

License No. 156—Ortho Pharmaceutical Corporation, Raritan, N. J.

1. BLOOD FRACTIONS

Anti-human serum

Anti-Rh typing serums:
Anti-Rh_0 (Anti-D)
Anti-Rh_0' (Anti-CD)
Anti-rh' (Anti-C)
Anti-rh'' (Anti-E)

License No. 157—Certified Blood Donor Service, Jamaica, N. Y.

1. BLOOD FRACTIONS

Anti-human serum
Grouping serum, Anti-A
Grouping serum, Anti-B

Anti-Rh typing serums:
Anti-Rh_0 (Anti-D)
Anti-Rh_0' (Anti-CD)
Anti-Rh_0'' (Anti-DE)
Anti-rh' (Anti-C)
Anti-rh'' (Anti-E)
Anti-hr' (Anti-c)

License No. 158—Washington Blood Laboratory, Washington, D. C.

1. BLOOD FRACTIONS

Grouping serum, Anti-A
Grouping serum, Anti-B

Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rh_o' (Anti-CD)

License No. 159—Blood Grouping Laboratory of Boston, Inc., Boston, Mass.

1. BLOOD FRACTIONS

Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rh_o' (Anti-CD)

License No. 160—Gradwohl Laboratories, St. Louis, Mo.

1. BLOOD FRACTIONS

Absorbed Anti-A serum
Anti-human serum
Anti-M serum
Anti-N serum
Grouping serum, Anti-A
Grouping serum, Anti-B

License No. 161—Blood Transfusion Association, New York, N. Y.

1. BLOOD FRACTIONS

Anti-human serum
Blood, citrated whole (human)
Grouping serum, Anti-A
Grouping serum, Anti-B

Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rb_o' (Anti-CD)
Anti-rh′ (Anti-C)
Anti-rh″ (Anti-E)

License No. 162—N. Y. Post Graduate Medical School and Hospital, New York, N. Y.

1. BLOOD FRACTIONS

Blood, citrated whole (human)
Plasma, normal human

License No. 163—High Titer Serum Laboratory, New York, N. Y.

1. BLOOD FRACTIONS

Absorbed Anti-A serum
Grouping serum, Anti-A
Grouping serum, Anti-B

Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rh_o' (Anti-CD)
Anti-Rh_o'' (Anti-DE)
Anti-rh′ (Anti-C)
Anti-rh″ (Anti-E)

License No. 164—Knickerbocker Blood Bank, New York, N. Y.

1. BLOOD FRACTIONS
Blood, citrated whole (human)

License No. 165—Blood Bank Foundation, Nashville, Tenn.

1. BLOOD FRACTIONS
Blood, citrated whole (human)
Cells, packed red blood (human)
Cells, resuspended red blood (human)
Plasma, defibrinated normal human

License No. 167—Wm. Buchanan Blood Center, Dallas, Tex.

1. BLOOD FRACTIONS
Anti-human serum
Anti-Rh typing serums:
Anti-Rh_o (Anti-D)
Anti-Rh_o' (Anti-CD)
Anti-rh′ (Anti-C)
Anti-rh″ (Anti-E)
Anti-hr′ (Anti-c)

License No. 168—Mount Sinai Medical Research Foundation, Chicago, Ill.

1. BLOOD FRACTIONS
Anti-human serum
Anti-M serum
Anti-N serum

License No. 169—Chicago Blood Donor Service, Chicago, Ill.

1. BLOOD FRACTIONS
Blood, citrated whole (human)

License No. 170—Jackson Medical Laboratory and Blood Bank, Jackson, Tenn.

1. BLOOD FRACTIONS
Blood, citrated whole (human)

License No. 171—Courtland Laboratories, Los Angeles, Calif.

1. BLOOD FRACTIONS
Blood, citrated whole (human)
Plasma, normal human

License No. 172—Bio-Research Laboratories, Berkeley, Calif.

1. TUBERCULIN PREPARATIONS
Tuberculin Old

License No. 173—Bellevue Clinical Laboratories, Memphis, Tenn.

1. BLOOD FRACTIONS
Blood, citrated whole (human)

U. S. GOVERNMENT PRINTING OFFICE: 1949

UNIVERSITY OF ILLINOIS-URBANA
3 0112 106520585